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Montana DEER & DEER Hunting

A MANAGEMENT ANALYSIS

Montana Fish, Wildlife & Parks
WILDLIFE DIVISION *Oct·1995*

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INTRODUCTION

Deer are the most common big game animal in Montana. Mule deer (MD) occur throughout nearly all areas of the state and white-tailed deer (WTD) predominate in northwestern Montana and throughout the riparian zones and adjacent bottom lands of the southwest and east. Deer hunting is popular among Montanans, with approximately one in every five hunting deer annually. A survey of deer hunters in 1985 revealed that total expenditures by resident and nonresident hunters amounted to $63,875,730 (Brooks, 1988).

Today's deer management is influenced by many factors some of which are beyond the control of deer managers. An example is Montana's human population and the changes occurring in agriculture. Population estimates by the Census Bureau for 1994 indicate that eight of the ten fastest-growing states are in the Rocky Mountain region with Montana gaining 1.8% between 1993 and 1994 (841,000 to 856,000 respectively).

At the same time, landownership and human use patterns are changing. The number of smaller farms and ranches is decreasing and the number of larger ones is increasing. The Montana Crop & Livestock Reporting Service estimated there were 24,600 farms and ranches in Montana in 1992. This compares with over 37,200 farms and ranches in 1950. In 1950 the average size of a farm or ranch was 1,747 acres. By 1992, this has increased to an average size of 2,439 acres.

The growing number of Montanans has resulted in increased subdivision activity, especially in western Montana. In the past wildlife managers most frequently had to address problems with deer in agricultural settings, now these managers must address the problem that increasing deer populations can pose in an urban setting. Here the issues of public safety, trespass of private property, individual landowner preferences often dictate the use of new and innovative approaches.

A change in how some landowners view wildlife and the hunters that wish to pursue wildlife has occurred with the increased size of farms and ranches. Hunters no longer can count on receiving permission to hunt, and many times a fee or use of an outfitter is the only way to gain access. This change has resulted in increased hunting pressure to the remaining open private land and public land. More hunters hunting less and on less land not only has caused complaints of "too many hunters" in some areas but has also influenced the age and sex characteristics of the deer population to the point that hunters are complaining about the number and size of the bucks in some locations.

Recognizing the changes that are occurring and evaluating deer management in Montana is the purpose of this analysis. This analysis will describe deer in relation to their environment and the effects of hunting as they relate to both the hunter and deer. Our purpose is to provide an information base for future management decisions. The next phase will be to provide direction for Montana's future deer management program by establishing management objectives for the different areas of the state.

DEER AND THEIR ENVIRONMENT

Differences in existing plant communities, weather patterns, topography, human use, deer biology and behavior, and a multitude of other factors influence the characteristics of a particular deer population. The two species of deer (white-tailed and mule) occur in just about all Montana habitats, from the coniferous forests and intermountain valleys, mountain foothills and isolated mountain ranges, to the rangelands, badlands, and croplands of the eastern plains. Within each of these habitats, deer are born, live, and die, and they do so in very different ways.

The results of studies recently completed under the Montana Statewide Deer Research Project and analysis of data by regional management biologists have greatly enhanced our understanding of deer/habitat interrelationships and their influence on population characteristics, dynamics and management. The following general description summarizes some of those findings and was taken from a recent paper entitled "Deer Habitat Relationships and Management In The Northern Rocky Mountains and Great Plains (Mackie, et al, 1992).

> In addition to general forest cover, deer ranges in the mountainous region are characterized by high topographic diversity and relief. These give rise to diverse vegetative cover. The region also has moderate summer and winter temperatures, more precipitation and locally heavier snowfall than the plains. Logging and recreation predominate among land uses.
>
> The plains lack the topographic and vegetational diversity of the mountains. The region is characterized by strong differences between seasons and year to year variation in temperature and precipitation. Livestock grazing and farming are predominant land uses.
>
> Deer employ a variety of strategies to cope with environmental features and conditions they encounter in the two regions. Most deer in the mountainous environments are migratory; moving between traditional winter and summer ranges. These movements typically occur as individual behavior rather than mass migration. Many involve relatively short distances up adjacent drainages or to other, nearby ranges. Others may involve longer movements as far as 80 miles over divides and/or to distant drainages. Where conditions are suitable, some deer will remain yearlong residents of the winter range.
>
> Distinct seasonal ranges are less apparent in prairie habitats and are used by individual deer in a variety of ways to cope with the considerable environmental variation. Most deer occupy annual home ranges in which local use patterns vary by season and weather conditions. However, use of some habitat complexes may require regular, seasonal, migration-like movements at different times of the year because of local environmental deficiencies (ie. drought).

Other notable differences in deer behavior and population characteristics associated with the two regions were:

1) Deer in mountainous habitats generally occupy the smallest seasonal home ranges; deer in the breaks and badlands are intermediate; and those in the open prairie have the largest. On diverse, riparian-agricultural habitat along river bottoms and on the plains, summer home ranges are relatively small.

2) Deer on mountainous ranges, which are generally characterized by restricted animal distribution and movement, high deer density and low forage quality, limit energy expenditure by selecting small microenvironments, and forage on a wide variety of plant material to maintain physiological function and body heat. Although winter ranges in good condition are key to deer survival over winter, these adaptations underscore the additional importance of stored fat accumulated the previous summer and autumn.

3) In prairie environments, especially under open winter conditions, deer tend to range more widely, utilizing agricultural and riparian habitats to obtain nearly 1/2 of the yearlong diet.

4) Over-winter survival and recruitment of mule deer fawns into adult populations are generally low in mountainous-foothill habitats. Moderate to high recruitment is typical of breaks, badlands and prairie, although annual variations can be considerable as environmental conditions fluctuate. Winter survival and recruitment are consistently high for whitetails along the major riparian zones of eastern Montana.

5) Adult survival patterns vary inversely with fawn survival and hunting pressure. In mountain environments, adults of both species exhibit considerable longevity; females commonly live 12 - 16 years and males can live 8 to 10. In prairies, females live 8 to 10 years, while males live 4 to 5 years (rarely 6-8 years).

What does all this mean to deer management?

Although the bottom line is that deer management must be tailored to the local situation (meaning those with similar habitats and population characteristics), there are four characteristics to keep in mind when attempting to manage a specific population.

First of all, because of the annual variability of the environmental conditions of the prairie, deer populations can fluctuate in number widely in just a few years. The environmental conditions are more stable in the mountainous terrain and, therefore, the deer populations do not fluctuate as much or as frequently. Therefore, eastern Montana hunting seasons are typically more liberal to take advantage of these wide fluctuations in the prairie environments while they tend to be more conservative in the more mountainous regions to match the general stability of populations in those environments. Other factors that influence this

difference are the general expanse of habitat and lower human population in the east compared to western Montana.

Secondly, the faster growing, short-lived deer of the prairie tend to produce larger antlers at an earlier age than those in the mountainous regions. A deer with larger antlers in the prairie areas of Montana may be the same age as one with smaller antlers in the mountainous region.

Thirdly, and probably most important, although different season types can alter the age structure of a deer population, population fluctuations will still continue due to changing environmental conditions and other factors. Therefore, a season established to limit the hunter harvest of bucks to "save" them so they will become older and be harvested at a later date, will not consistently result in older animals.

Finally, to be successful, deer management must employ a strategy that includes periodic (annual if possible) monitoring of population size and performance. Results of Montana deer research from five separate locations with both whitetails and mule deer found that at population levels acceptable to both landowners and hunters, density-dependence and compensation could not be documented (Mackie et al, 1990). In other words, it was not possible to predict fawn production or yield based upon the size of the deer population. It appears environmental conditions and their variation influence deer population size and age structure before density plays a part.

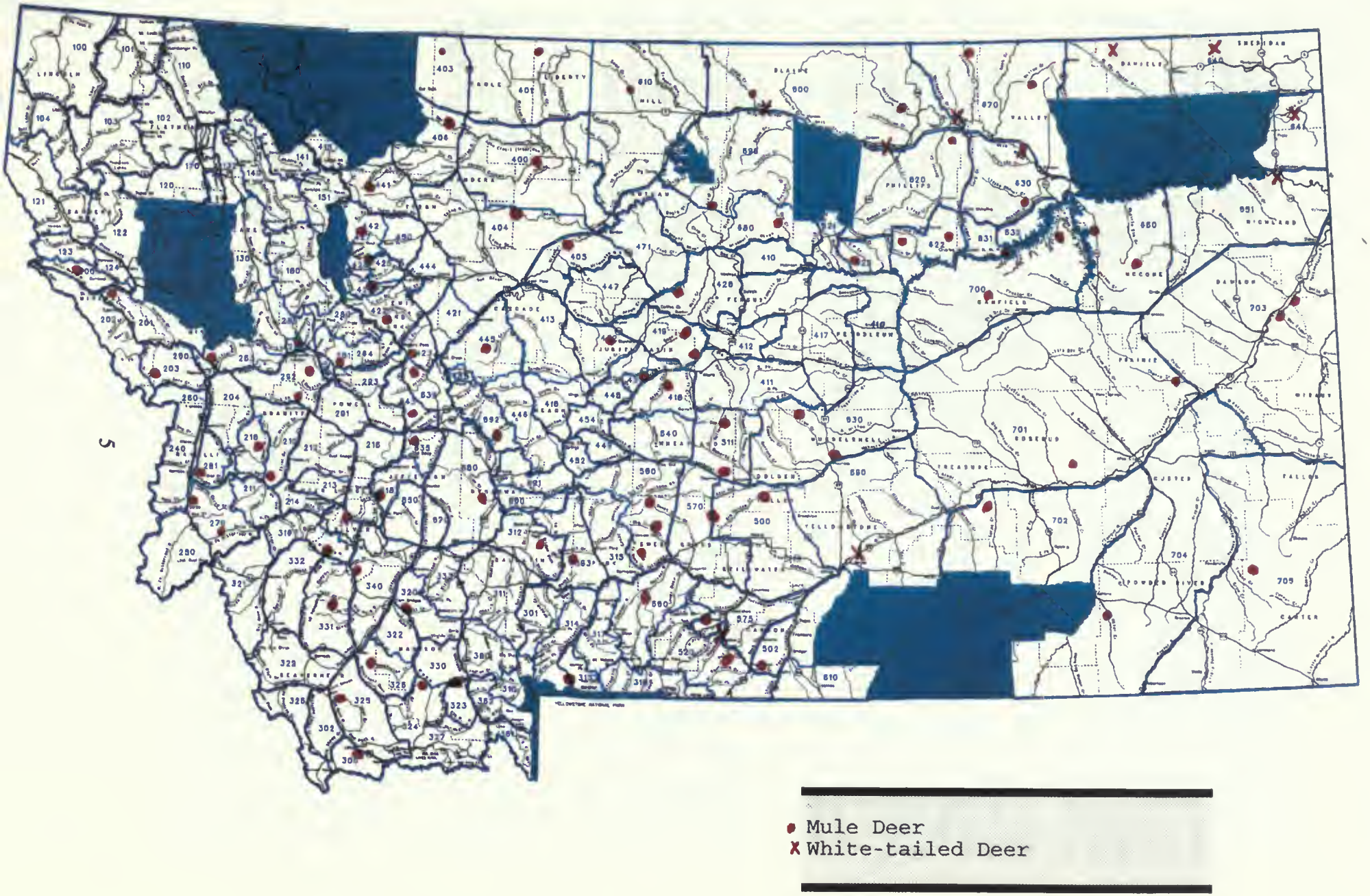
Deer Population Monitoring

To monitor the changes that occur in deer population numbers, characteristics and distribution over time, trend survey routes have been established within the various habitats across the state. Trends in representative populations, their sex and age structure and distribution provides the baseline information needed to establish appropriate license quotas and to direct other habitat and hunter access programs.

Figure 1 shows the location of the various trend (population & sex/age) surveys within each region of the state. Most of these surveys were established following the low deer populations observed in the late 1960s and early 1970s.

Deer (both species combined) numbers have steadily increased in Montana since the low recorded in the 1970s. Whitetails have steadily increased in number and distribution throughout the state. They may be at all time highs in many areas west and east of the divide. Mule deer have also increased, particularly in the prairie areas, where they have reached levels comparable to the highs prior to the decline noted in the 70s. However, in several mountainous areas of the state, mule deer numbers appear to be leveling off or slightly declining. A description of the trend in each region of the state follows.

Figure 1. Mule Deer and White-tailed Deer Trend Survey Routes.



NORTHWEST (Region 1)
Restrictive hunting regulations in the mid 1970s in conjunction with nearly two decades of mild winters and habitat changes benefiting douglas fir have allowed dramatic (three fold in some cases) increases in white-tailed deer populations, based on harvest records. At the same time, although there has also been an increase in mule deer, growth of these populations have leveled off; some populations may have actually started to decline. Although no standardized trend survey routes have been established, harvest survey information and check station information (See Harvest Section) provide indicators of population trend and characteristics.

SOUTH, WEST OF CONTINENTAL DIVIDE (Region 2)
Similar deer population trends as in the northwest are evident. White-tailed deer harvests have more than tripled in the region. Mule deer show a decline in recent years in some areas, with stable to increasing populations and harvest in others. Of note is the change in the ratio of white-tailed to mule deer in the harvest since the early eighties. Prior to 1981, white-tailed deer comprised only 1/3 of the region deer harvest, whereas today that number is fully 2/3. Standardized trend survey routes have been established in 14 locations within the region. Post hunting season mule deer buck:doe ratios in areas with low security and high hunting pressure remain at 4-10 bucks/100 does.

SOUTHWESTERN (Region 3)
General deer population trends indicate mule deer numbers somewhat below recorded highs but above the lows observed in the early 70s. In the central and northern portion of region 3, the number of buck deer observed has declined in recent years, with some surveys recording 5% or less bucks following the hunting season. These are areas with good access, high hunter numbers and low habitat security. Whitetail distribution has expanded over time and harvest has been increasing over the years. Standardized trend survey routes have been established in 13 locations throughout the region.

CENTRAL (Region 4)
Since the lows of the 1970s, mule deer numbers in most areas have generally increased, stabilizing at a level below that observed in the 1980s. Shifts in areas of winter use have also been observed in some areas. Whitetail harvest has been increasing and whitetail distribution has expanded.

SOUTHCENTRAL (Region 5)
Two general habitat types occur - mountainous and prairie areas. Mule deer population trends in each area are somewhat unique. Mule deer harvest information indicates that harvest levels fluctuate at approximately five year intervals, with peak harvests coming during the first half of the decade, years ending in 0 - 4. Mule deer buck harvests during the last four peak periods have remained constant despite fluctuations in hunters numbers and deer populations indicating that trying to attain high mule deer buck numbers is probably not possible. Mule deer population levels in mountain districts have not fluctuated to the degree that they have in the prairie districts, and they are making a slow steady recovery from the

low observed in the 1970s. Prairie districts on the other hand, have exhibited substantial growth during the past four decades. Whitetails have shown steady consistent population growth, with a nearly seven fold increase in harvests since 1960. In region five, the total buck harvest for 1990-94 is 21% greater than it was from 1960-64. The increase is due entirely to a 574% increase in whitetail buck harvest. In prior years, whitetail numbers in the eastern half of the region have primarily been reduced or slowed by sporadic outbreaks of EHD, a disease which generally occurs at high population levels. Deer population levels for both whitetail and mule deer are currently at all time highs in the region. It is expected that trends will decline through the last half of the decade due to mule deer fluctuations.

NORTHEAST (Region 6)

Mule deer populations steadily increased from 1987 through 1990, leveling off from 1992 to the present at the most recent 10 year average. Declining numbers were usually preceded by poorer fawn production and survival. The extreme weather conditions sometimes noted in this region can significantly affect fawn production and recruitment as well as antler size. Total number of whitetails have increased by 68% from 1987 to 1994. A decline noted in 1990 and 1991 was thought to be associated with an EHD outbreak. Standardized trend survey routes have been established in 14 locations for mule deer and eight locations for whitetails across seven major habitat types.

SOUTHEAST (Region 7)

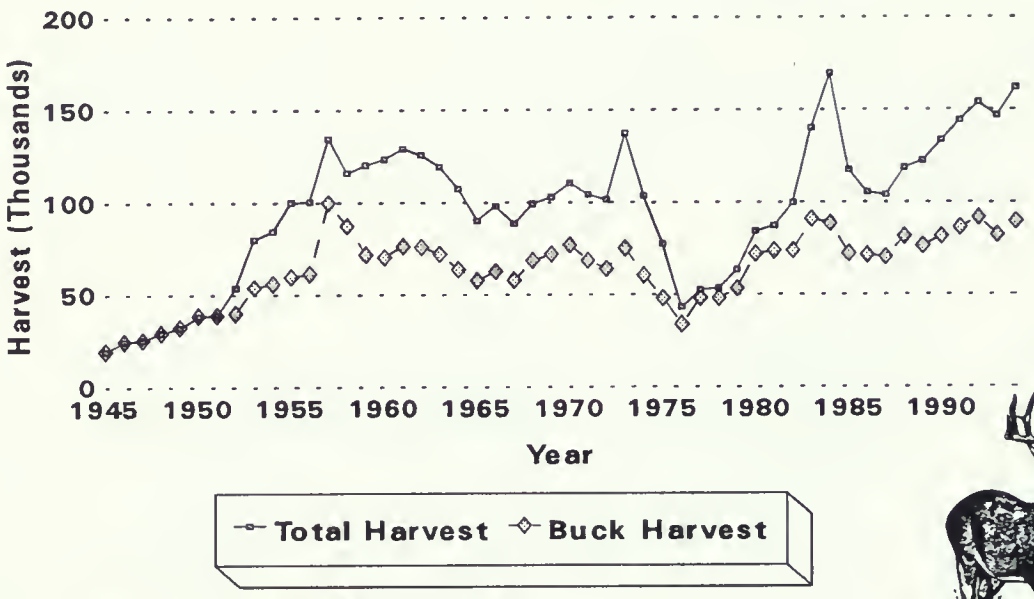
Nine trend survey routes have been established within the five general habitat types of the area. Mule deer populations declined from the early to mid 80s and have since recovered. Whitetail populations have shown similar patterns. The better habitats support ten deer per square mile, while the poorer habitats have seven deer per square mile. In better habitat, 65-85 bucks per 100 does are present prior to the hunting season. Four-point or larger bucks comprise 50-75% of the buck component.

TRENDS IN DEER HARVEST:

Total deer harvest (mule deer & white-tailed deer) and total buck harvest have steadily increased in Montana since 1945 (Figure 2). Significant periodic declines in harvest occurred in the mid to late 60s, in the 70s, and in the 80s.

For the period 1960 to 1994, the annual mule deer harvest has fluctuated widely with a slightly downward trend (Figure 3). A significant decline occurred in the mid to late 70s. During this same period deer numbers across the western United States declined. Since then, mule deer harvests have rebounded, approaching the previously recorded highs. The whitetail harvest has steadily increased throughout the same period (Figure 4). A decline in harvest occurred in the mid to late 70s, concurrently with mule deer, but it was not as significant as mule deer declines in the mid to late 60s and 80s. Whitetails have gained a significant portion of the overall statewide deer harvest, 43% of the harvest in 1994 compared with 20% in 1960 (Figure 5). Hunters are apparently responding to the increased numbers of whitetails and their expanding distribution.

Figure 2. Trends in Statewide Deer Harvest. 1945-1994



SOURCE: Statewide Harvest Surveys

Figure 3. Trend in Mule Deer Harvest. 1960-1994

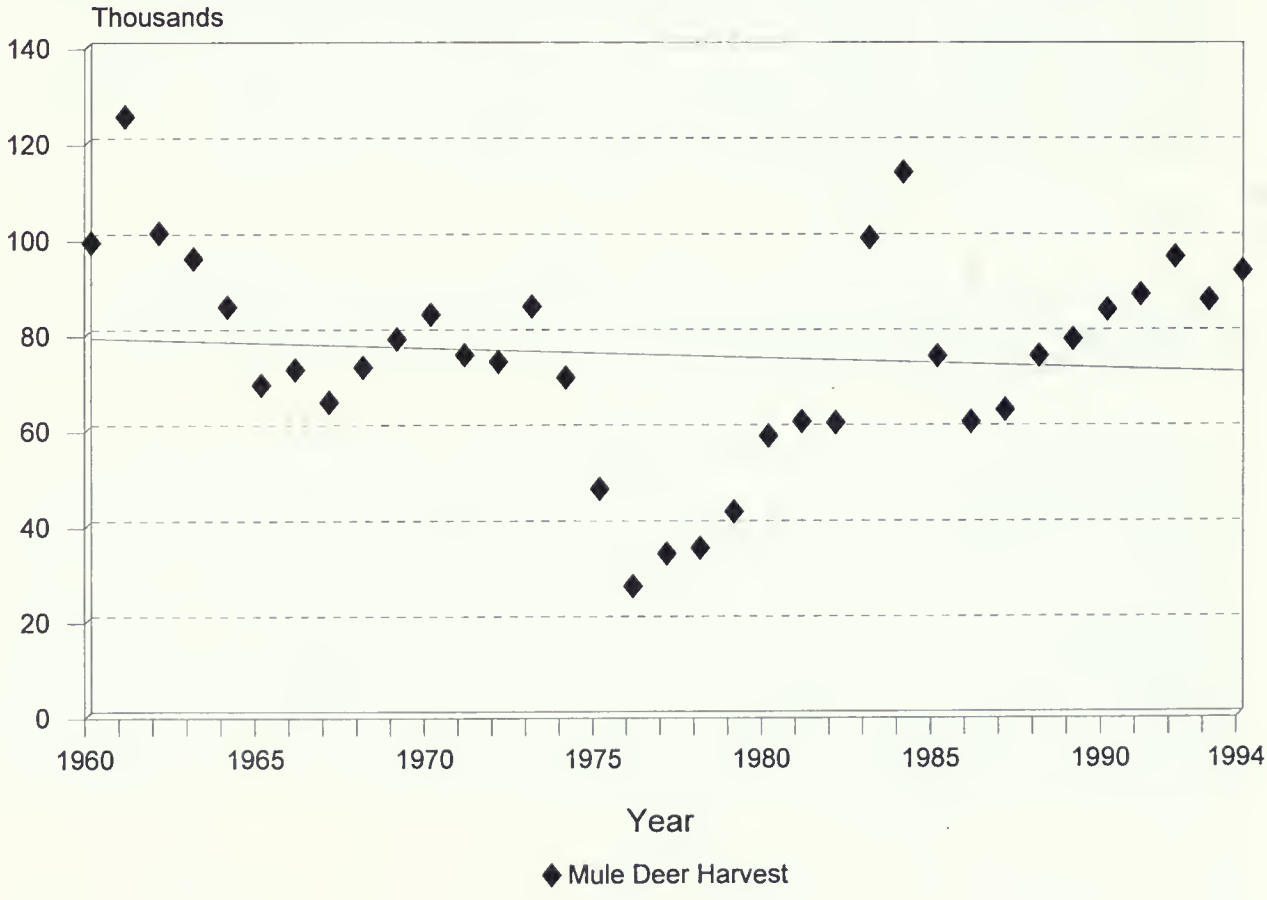
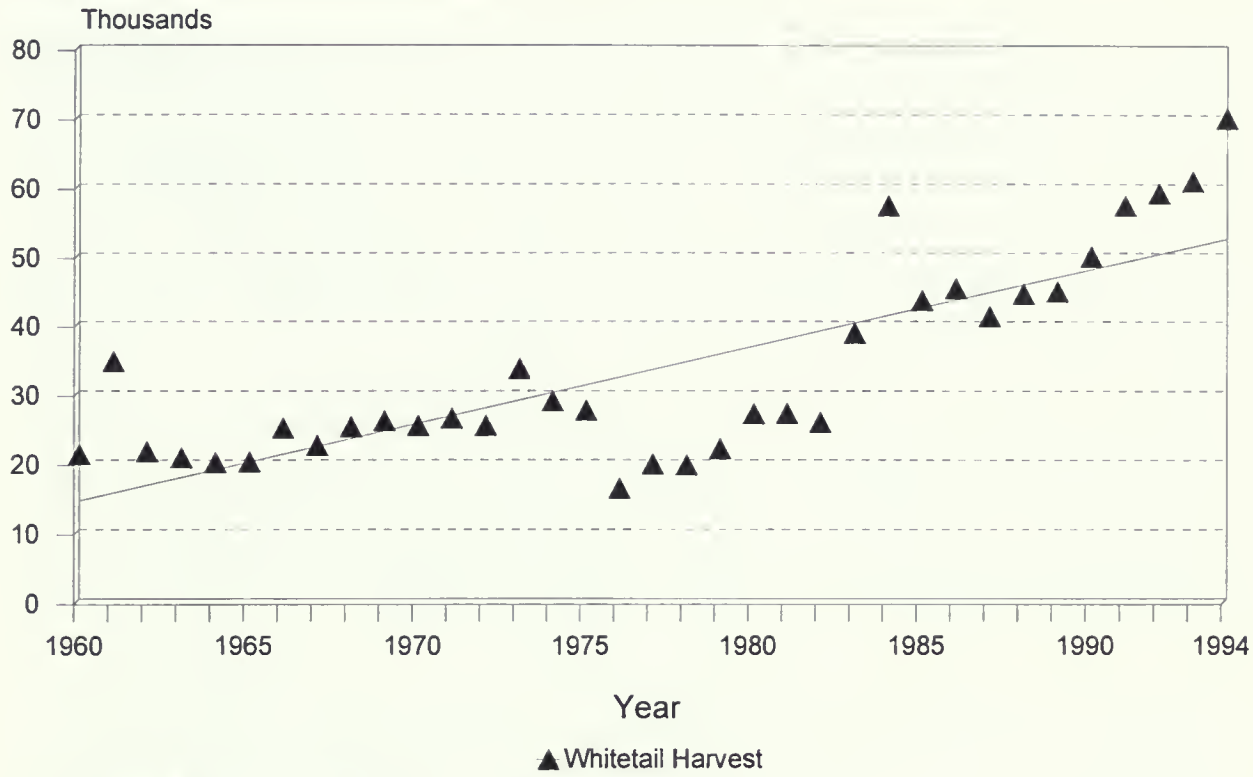
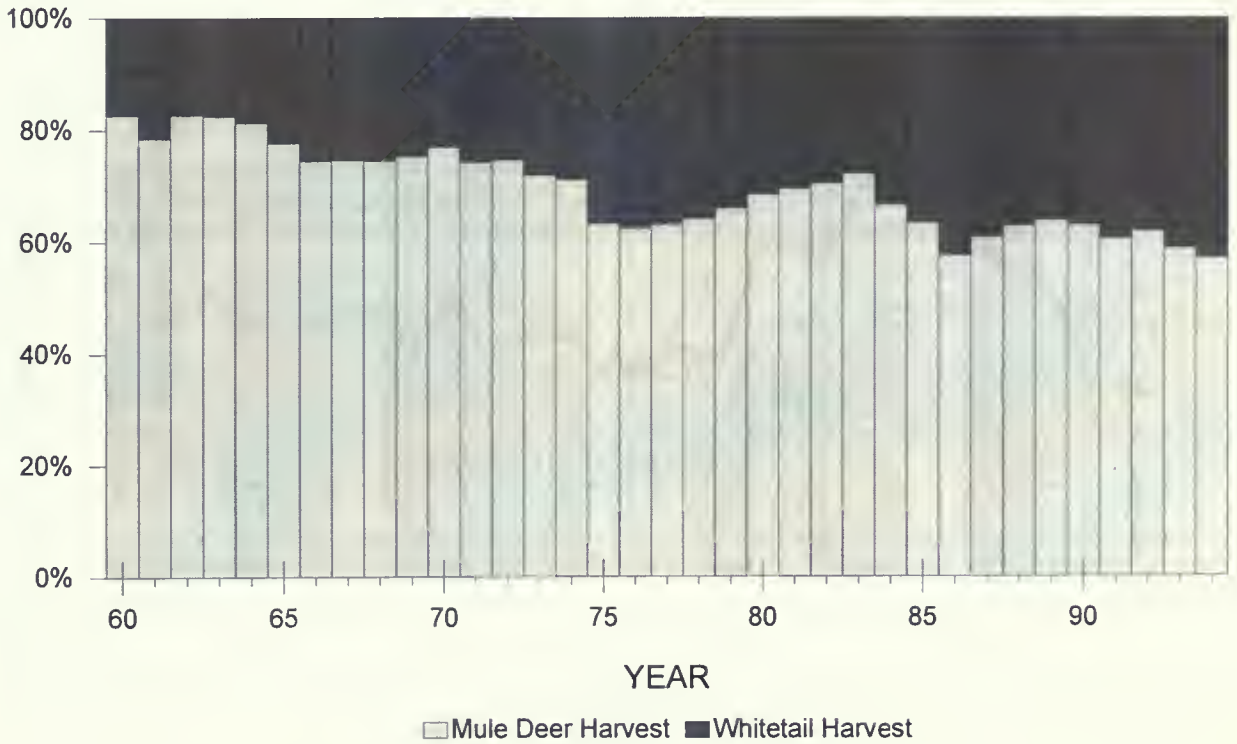


Figure 4. Trend In White-tailed Deer Harvest. 1960-1994



MFWP Harvest Statistics

Figure 5. Percent Deer Harvest By Species. 1960-1994



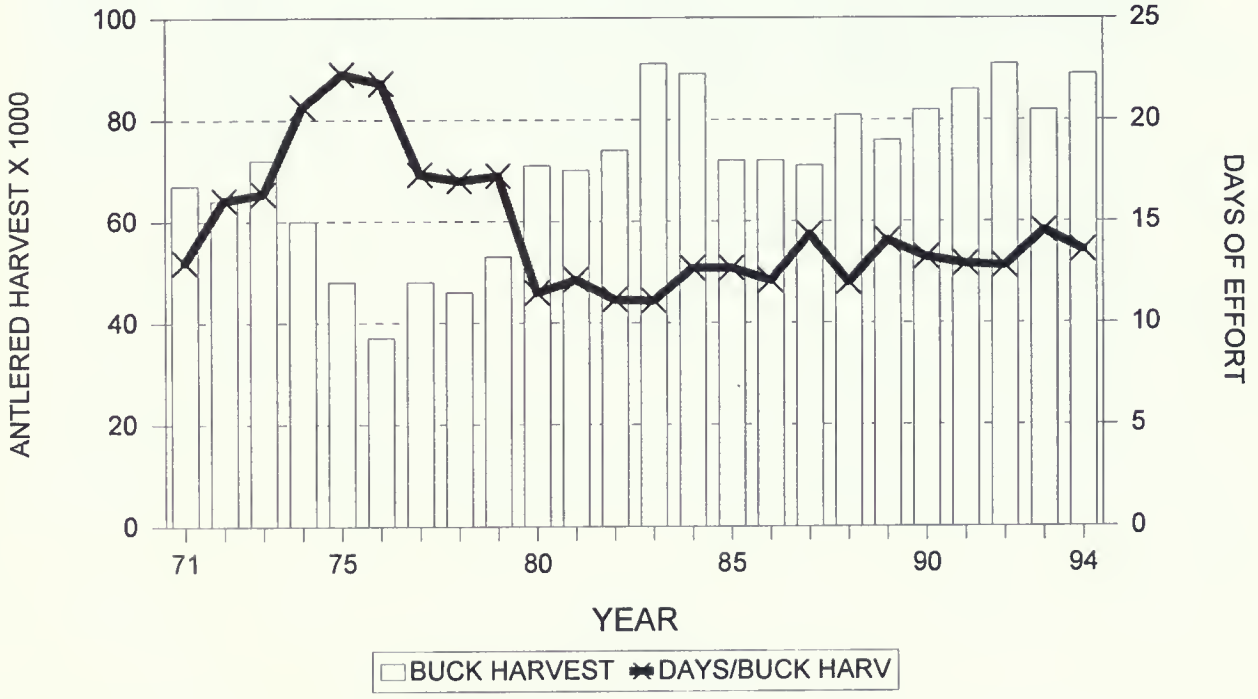
MFWP Harvest Statistics

Buck harvest has been shown to be the best indicator of long term population trends in white-tailed and mule deer populations of eastern Montana (Dusek et al, 1989, Wood et al, 1989). The harvest survey information was reviewed for consistency as a part of the effort to complete a programmatic environmental impact statement (EIS) on Montana's wildlife management program. Deer harvest survey methodology has changed throughout the years. Although early harvest figures are a reasonable reflection of what actually occurred, harvest trend information since 1971 is the most accurate. Therefore, the following estimates of trend in harvest are for the period 1971 - 1994.

Total buck deer (both species) harvest from 1971 - 1994 indicates a strong upward trend, since the low recorded in 1976 (Figure 6). Deer hunter days is the only estimate of hunter effort available. Deer hunter effort per buck deer in the bag varied inversely with numbers of buck deer harvested (Figure 6). In other words, with an increase in numbers of bucks harvested over time, a reflection of increasing populations, unit effort expended per buck harvested declined. This same relationship was found when comparing hunter effort vs. whitetail bucks harvested in western, southern and eastern Montana.

The trend in both mule deer and white-tailed deer buck harvest is compared regionally in Appendix II. The buck harvest in Region 1 indicates populations of both mule deer and white-tailed deer in northwestern Montana are significantly higher now than those recorded in the 60s and 70s. Mule deer populations also appear to be up in the northeast, Region 6. White-tailed deer populations are also at all time highs in Regions 2 and 3. Periodic population fluctuations typical of mule deer in the prairie environment is very evident in the buck harvest of Region 7, the southeast portion of the state.

Figure 6. Buck Harvest vs Hunter Effort. 1971-1994



MFWP HARVEST STATISTICS (RECONCILED)

AGE OF BUCKS VERSUS THE SIZE OF ANTLERS:

The size of a deer's antlers is reflective of its age, nutrition, social position, health of the herd, and genetics.

Nutrition is a major determinant in antler growth. In penned and enclosed situations it has been shown that altering the feeding mixture to increase protein will change antler size in all age classes and especially yearling bucks. In Montana, this is most apparent during drought periods in the eastern prairie. During years of extreme drought, a higher percentage of the older aged bucks have smaller antlers.

Age is another important factor influencing antler growth. Measurements of main beam antler length at checking stations in southwestern Montana show the length continues to increase up through 6.5 years, although the percent change in length decreases markedly as deer get older. (Table 1). The Havre check station main beam antler length information shows that deer gain the majority of their antler growth by 4 years of age. The difference in length between the 4 and $\geq$ 5 year classes was only 0.9 inches.

Studies have shown that bucks born later in the year typically have smaller antlers as yearlings, and often are spikes. A whitetail study by Dr. Harry Jacobson, Mississippi State University, refuted the conventional wisdom that these smaller yearlings are inferior. In that study, antler growth of those smaller bucks caught up to that of the larger yearlings in later years and at times surpassed them to become large trophy class bucks.

Genetics is becoming a more popular theory for why some bucks grow larger antlers than others. Although there is much to be learned about genetic influences, the findings of Dr. Jacobson indicate that bucks with typically small antlers throughout life can sire offspring with larger antlers. Large antler bucks did not predictably sire large antler bucks in those studies.

Table 1. Main antler beam length in relation to age for mule deer.

Age	Mean Beam Length (cm)	Percent Change	Range (cm)	Standard Deviation	N
1.5	23.4		2.8 - 52.5	53.7	419
2.5	34.3	46.5	11.3 - 57.3	63.0	181
3.5	40.1	16.8	23.1 - 59.1	55.7	116
4.5	45.7	13.9	31.4 - 68.0	69.5	72
5.5	47.4	3.7	37.5 - 54.6	54.8	18
6.5+	50.2	5.9	35.6 - 59.2	64.9	11

Additionally, an important factor in antler size was the genetic contribution of the female.

What does all this mean for management? First, antler growth is highly variable and is influenced by nutrition, age, and genetics. Second, the age of a deer influences the size of its antlers but not the number of antler points. Third, any attempt to cull "inferior" bucks to produce larger bucks in wild populations is likely to fail.

RESULTS FROM HUNTER CHECK STATIONS:

Hunter checking stations have been operated at several locations across the state, some for many years. In addition to total harvest, number of hunters, and location of kill, measurements of antlers, and ages of harvested deer have also been collected.

Antler point versus age of mule deer bucks was compared from checking station information collected in three regions (Tables 2, 3, 4 and 5). Mule deer 2.5 years and older from the northwest region had a much higher incidence of 1-2 point antlers (fewer antler points) than those in the southwest or northeast. Similarly, at 2.5 years, a lower percentage of deer from the northwest had 3- and 4-point antlers. This supports the generalization that deer occupying the coniferous forests of the northwest tend to grow slower.

Table 2. Comparison of percent of mule deer with 1-or 2- points in three regions of Montana.

Age	Northwest	Southwest	Northeast
1.5	92%	91%	91%
2.5	53%	21%	19%
3.5	40%	6%	9%
4.5	10%	5%	3%

Table 3. Comparison of percent of mule deer with 3 points in three regions of Montana.

Age	Northwest	Southwest	Northeast
1.5	2%	8%	8%
2.5	34%	40%	42%
3.5	25%	21%	30%
4.5	14%	11%	20%

Table 4. Comparison of percent of mule deer with 4 points in three regions of Montana.			
Age	Northwest	Southwest	Northeast
1.5	5%	<1%	1%
2.5	11%	34%	36%
3.5	18%	60%	41%
4.5	29%	61%	54%

Table 5. Comparison of percent of mule deer with more than 5 points in three regions of Montana.			
Age	Northwest	Southwest	Northeast
1.5	0%	<1%	0%
2.5	2%	5%	3$
3.5	18%	12%	10%
4.5	47%	23%	23%

The information from the three checking stations also showed that a significantly higher percentage of 4.5 year old deer from the northwest had five points or more. This may indicate that deer from the northwest "catch up" and perhaps surpass their southern and eastern counterparts in antler points after reaching 4.5 years of age. Its interesting to note that in all three areas, a significant percentage of deer 4.5 years and older had fewer than 4 points (Table 2).

White-tailed deer antler point and age information from check stations paints a similar picture as that for mule deer. In the northeast (Region 6) 43% of the yearling bucks (1.5 years old) have 2-point or less antlers, while 87% of the yearlings from northwestern Montana (Region 1) do. As two year olds, 50% of the deer from northwestern Montana have 4 point or more antlers, while 84% of those in the northeast have antlers of that size.

TROPHY BUCKS

The most often used references for trophies are those publications by the Boone and Crockett Club, Safari Club International, and the Pope and Young Club. The recent publication "Judging Trophy Mule Deer" by Safari Club International noted: 1) "Mule deer are habitually larger in perception, than in reality;" 2) "No matter which measuring system is used to evaluate a trophy deer, an initial frustration often exists in trying to evaluate size of the deer's antlers while he is bounding, or running, or even standing perfectly still;" and 3) "It is frequently the hunt and the experience which converts the mule deer taken, into a trophy which is cherished."

Montana Big Game Trophies, a 1994 department publication (9th edition), lists Montana trophies in the Boone & Crockett and Pope and Young categories. Boone & Crockett typical mule deer records occur most frequently from Lincoln (11), Madison (9), and Lewis & Clark (6) Counties. Nontypical mule deer are recorded most frequently from Missoula (4), Ravalli (4), Sanders (3), Park (3), Madison (3), and Gallatin (3) Counties. Both typical and nontypical Boone & Crockett white-tailed deer are recorded most frequently from Flathead (24, 12), and Lincoln (10, 8) counties. It is interesting to note that although the information presented earlier indicated lower percentages of deer from the northwest, versus the southwest or northeast, are seen in each antler point class as age increases a significant number of the "trophy deer" come from the northwestern counties of the state. This would tend to support the notion that age plays an important role in producing Boone & Crockett class "trophy deer."

Pope & Young records for typical mule deer frequently come from Powder River county while typical whitetail frequently are recorded from Powell, Missoula, and Flathead Counties. Few nontypical antlers of both species are recorded under Pope & Young.

Boone & Crockett records indicate in Montana that 21 typical mule deer were taken in the 50's, 29 in the 60's, 11 in the 70's, 20 in the 80's, and seven more in the 90's. Three typical whitetail were recorded prior to 1930, nine in the 50's, 20 in the 60's, 30 in the 70's, 34 in the 80's, and 13 more in the 90's. The number of mule deer entering the record book are similar for each decade, while the number of whitetail are increasing. The increasing whitetail population together with the increased harvest in recent years has probably been a major factor in the number of whitetail entrees.

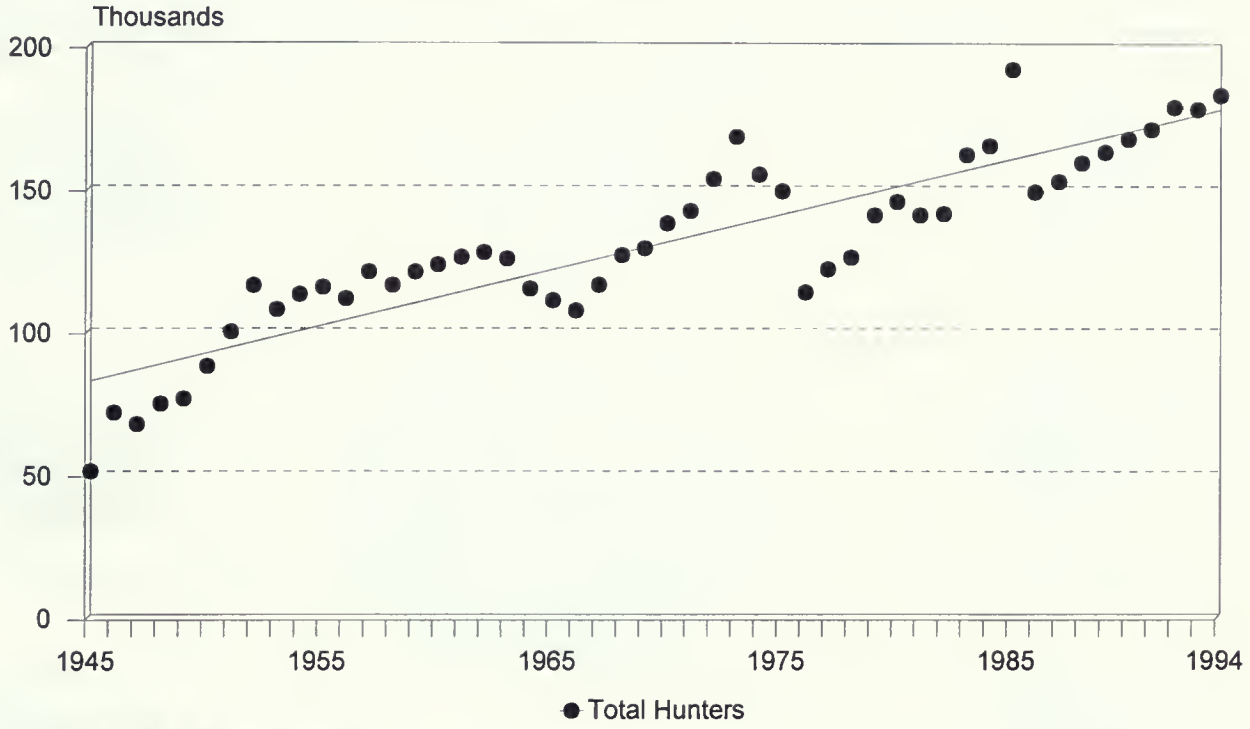
TRENDS IN HUNTERS NUMBERS:

The number of deer hunters has increased steadily since 1945 (Figure 7). Since 1971, the number of resident deer hunters has fluctuated widely, partially attributable to additional B licenses issued for antlerless deer in years of high populations (Figure 8). The number of nonresident hunters has not varied as widely because of the legislative limits of 17,000 Big Game Combination Licenses and 6,000 Deer Combination Licenses.

The density of deer hunters (number per square mile) varies across Fish, Wildlife & Parks designated regions. Region 1, in the northwest, had the highest density with 2.9 hunters per square mile in 1994. Region 6 and 7 had the lowest densities of hunters with 0.91 and 0.92 per square mile respectively. The regions ranked from highest to lowest as follows: 2, 1, 8, 3, 5, 4, 7 & 6.

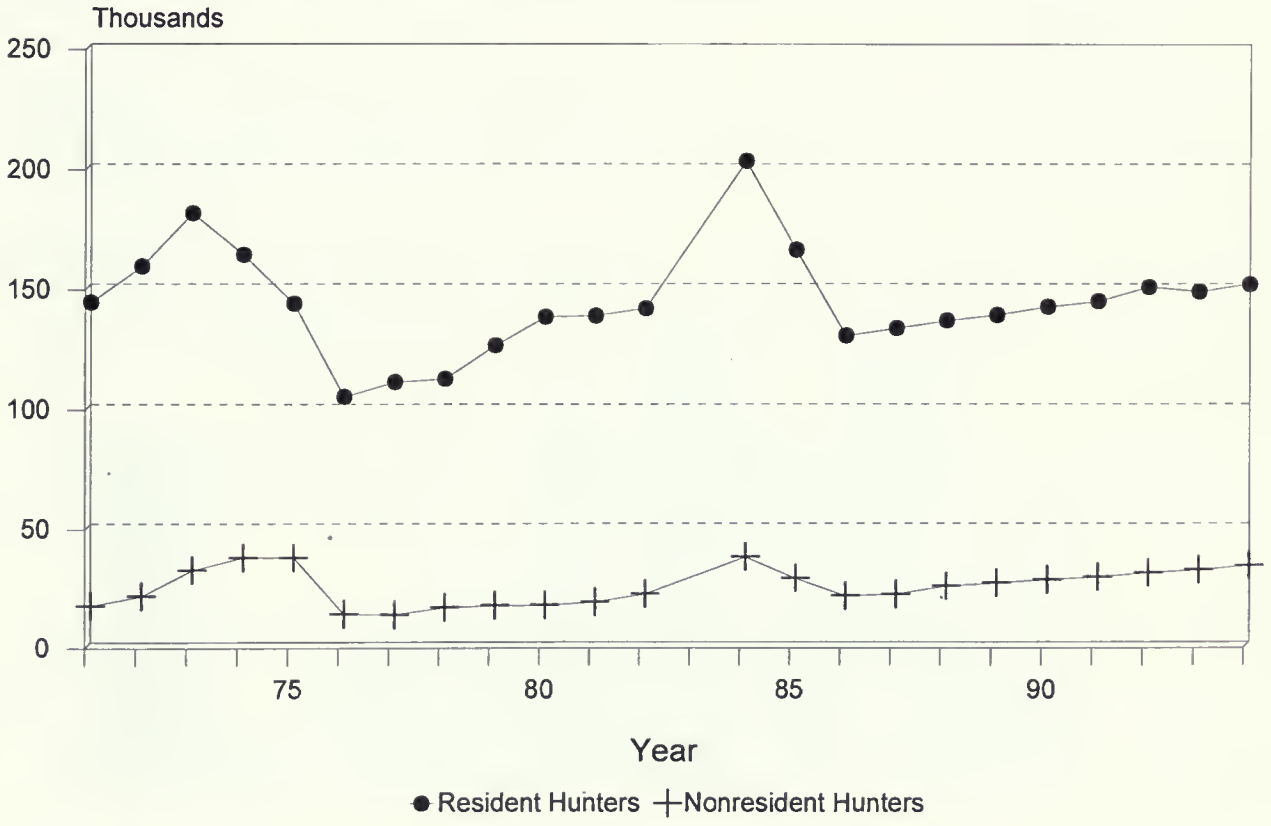
A review of 1992 deer harvest statistics indicates that 1/4 of the nonresident big game license holders (those with an elk license) do not hunt deer (Table 6). Only 9% of these license holders hunt deer in eastern Montana (Regions 6 - 7). In comparison, less than 1% of nonresident deer combination license holders do not hunt deer, and 66% hunt deer in eastern Montana.

Figure 7. Trend in Number of Montana Deer Hunters. 1945-1994



MFWP Harvest Statistics

Figure 8. Trend in Montana Deer Hunters. 1971-1994



MFWP Harvest Statistics

Table 6. Distribution of nonresident deer hunters by license type.[1]

Region	Nonresident Deer (B-11) Percent	Nonresident Big Game (B10) Percent
1	6	12
2	3	14
3	4	23
4	11	10
5	10	7
6	17	3
7	49	6
Did not hunt deer	<1	25

[1]1992 MFWP Harvest Statistics

IMPORTANCE OF PRIVATE LANDS:

Access to private land is very important to hunters in Montana. The following illustrates the importance of private land access and suggests the effectiveness of antlerless B licenses for resolving private land game damage complaints.

MULE DEER

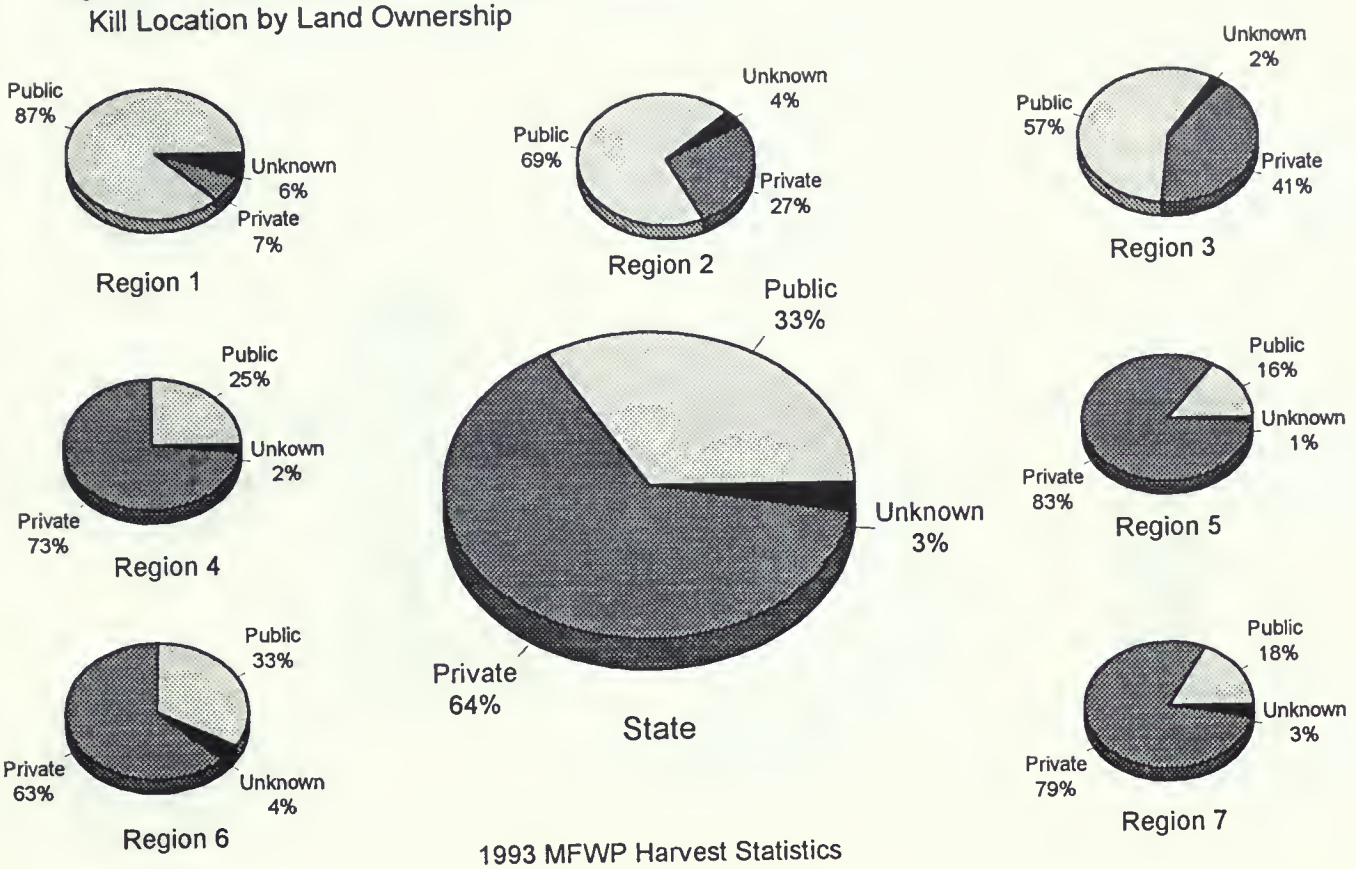
Sixty-four percent of the mule deer harvest in Montana comes from private land (Figure 9). Regionally, this percentage ranges from a high of 83% in Region 5, to a low of 7% in Region 1.

Statewide, 62% and 67% of the respective resident and nonresident mule deer harvest with the general A license occurs on private land (Figure 10). Over 80% of the general A License mule deer harvest in regions 5 and 7 occurs on private land. Except for Regions 4 and 6, nonresident A license holders kill more deer on private land than residents.

Seventy and 73%, respectively, of the residents and nonresidents kill antlerless mule deer using over-the-counter (multi-regional) antlerless mule deer B licenses on private land (Figure 11). Thus, over-the-counter antlerless mule deer B licenses are utilized mostly on private land.

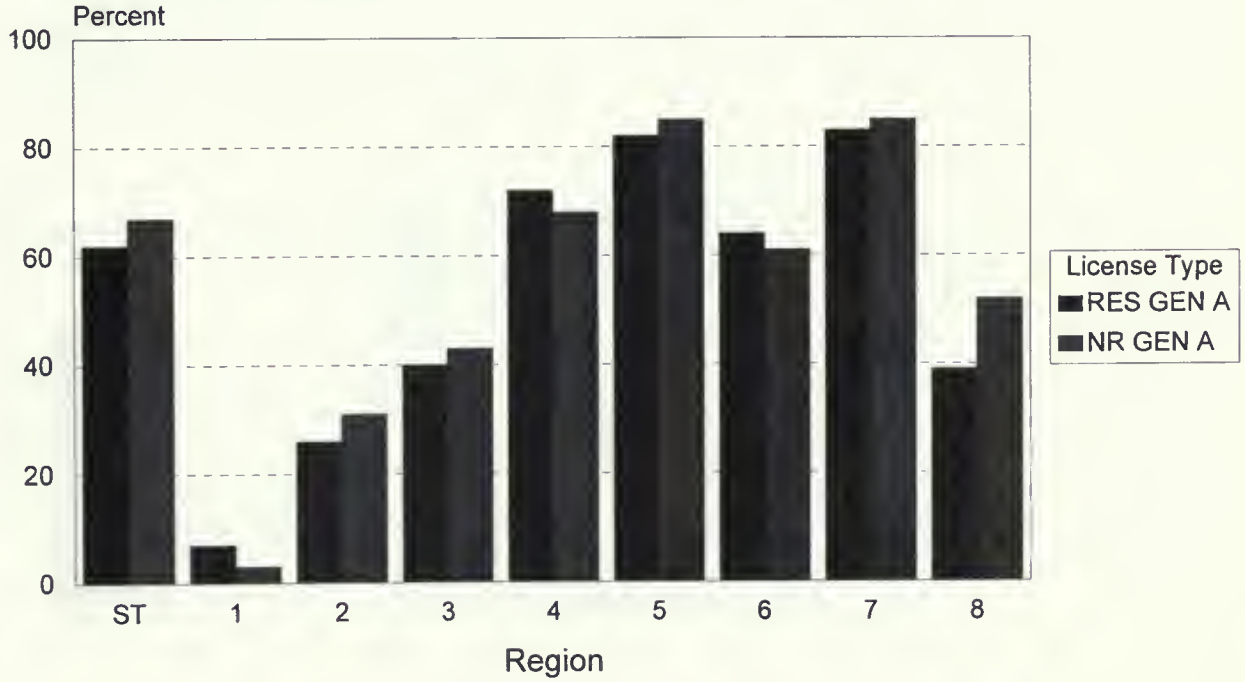
Location of harvest information from Regions 6 and 7 indicates over-the-counter (multi-regional) antlerless mule deer B license holders do not utilize public land within the CMR National Wildlife Refuge to a great extent. In Region 6, the CMR National Wildlife Refuge is located within hunting districts (HDs) 621, 622, 623, 631, and 632. Landownership in HDs 622, 623, 631, & 632 is comprised of 36% CMR, 44% Bureau of Land Management

Figure 9. Montana Mule Deer Harvest
Kill Location by Land Ownership



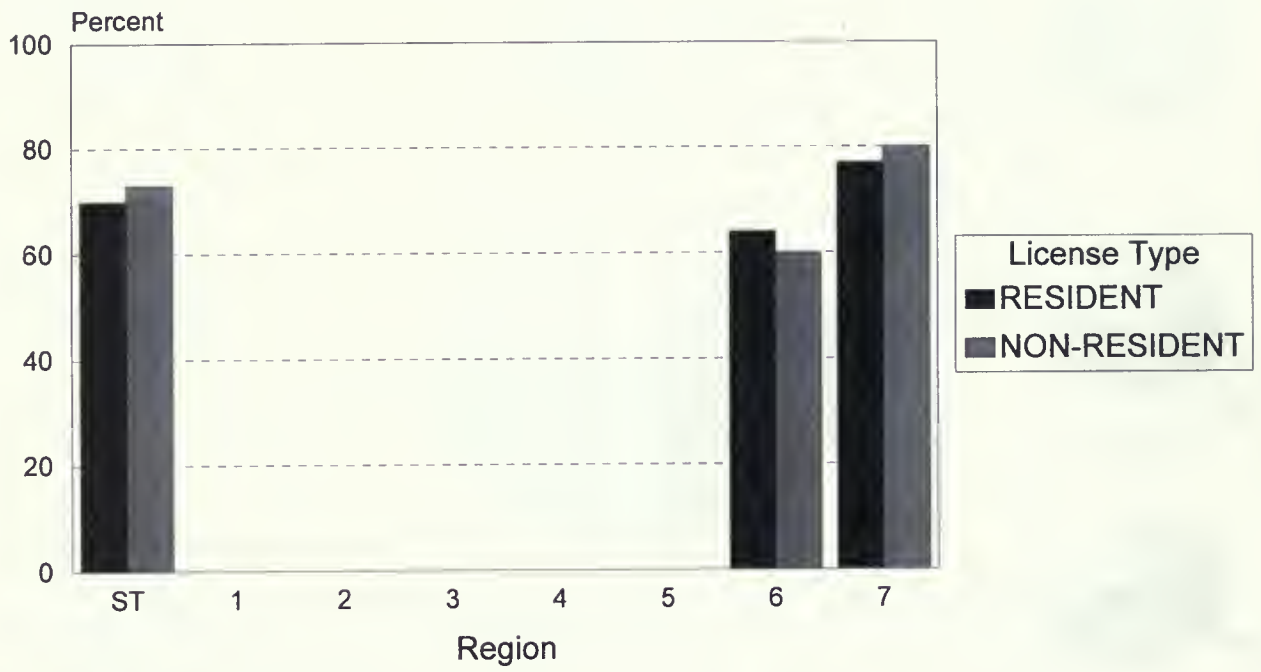
1993 MFWP Harvest Statistics

Figure 10. Resident/nonresident Mule Deer Harvest.
Percent of Kill on Private Land



1993 MFWP Harvest Statistics

Figure 11. Multi-region Antlerless Mule Deer B License Harvest
Percent of Kill on Private Land



1993 MFWP Harvest Statistics

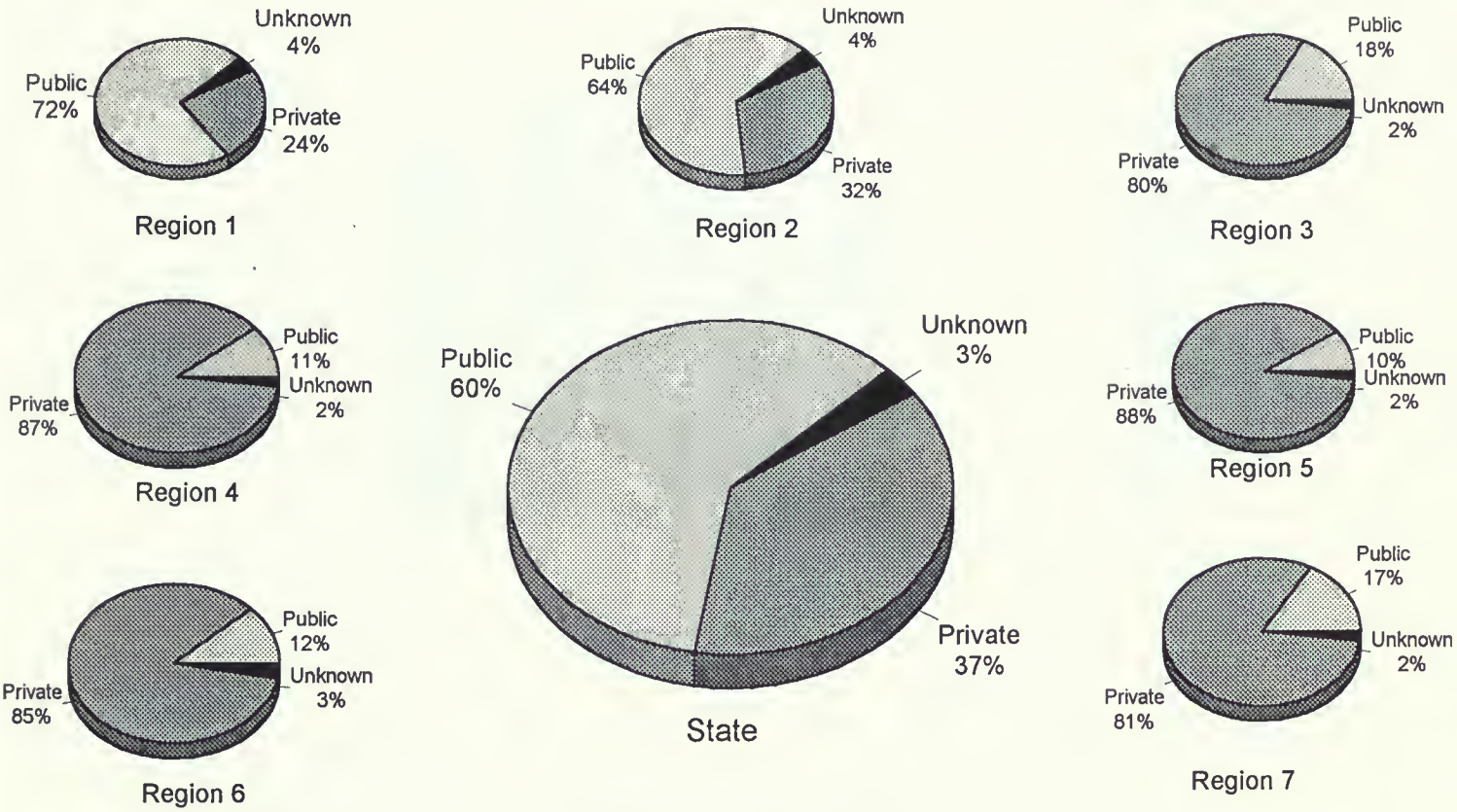
(BLM)/state land (DSL), and 20% private land. HD 621 is comprised of 32% CMR, 42% BLM/DSL, and 26% private. In 1993, over-the-counter (multi-regional) antlerless mule deer B license holders harvested 5,833 deer in Regions 6 & 7. Only 6% (346) of the deer harvested came from public land within HDs 621, 622, 623, 631, and 632. A similar relationship existed in Region 7 where only 3% of the deer taken by these license holders came from public land in HD 700, which includes the CMR National Wildlife Refuge.

WHITE-TAILED DEER

Sixty percent of the white-tailed deer harvest in Montana occurs on private land (Figure 12). Regionally this percentage ranges from a high of 88% in Region 5 to a low of 24% in Region 1.

A higher percentage of white-tailed deer are reported killed on private land than mule deer for all license holders (Figures 10, 11, 13, and 14). This is also true for all regions east of the divide (3 - 8). Marked differences between residents and nonresidents are not apparent. Eighty-five percent of the antlerless whitetail harvest by both resident and nonresident over-the-counter (Multi-regional) antlerless whitetail B license holders is taken on private land (Figure 14).

Figure 12. Montana White-tailed Deer Harvest
Kill Location by Land Ownership



1993 MFWP Harvest Statistics

Figure 13. Resident/nonresident Whitetail Deer Harvest.
Percent of Kill on Private Land

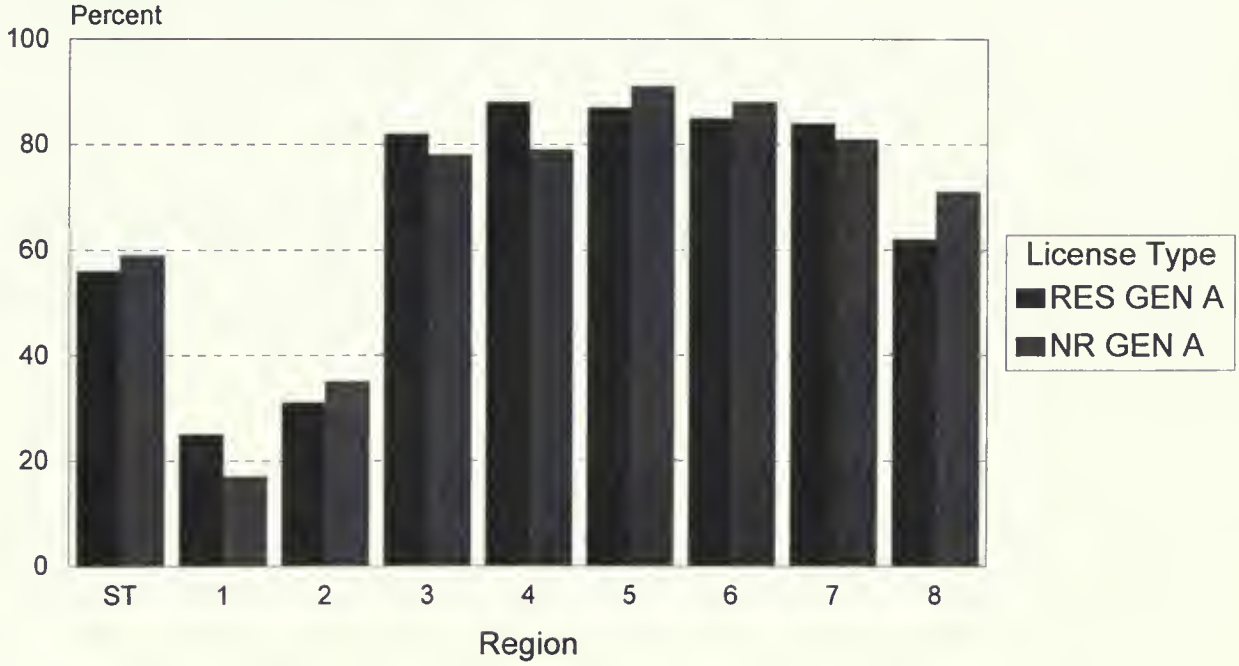
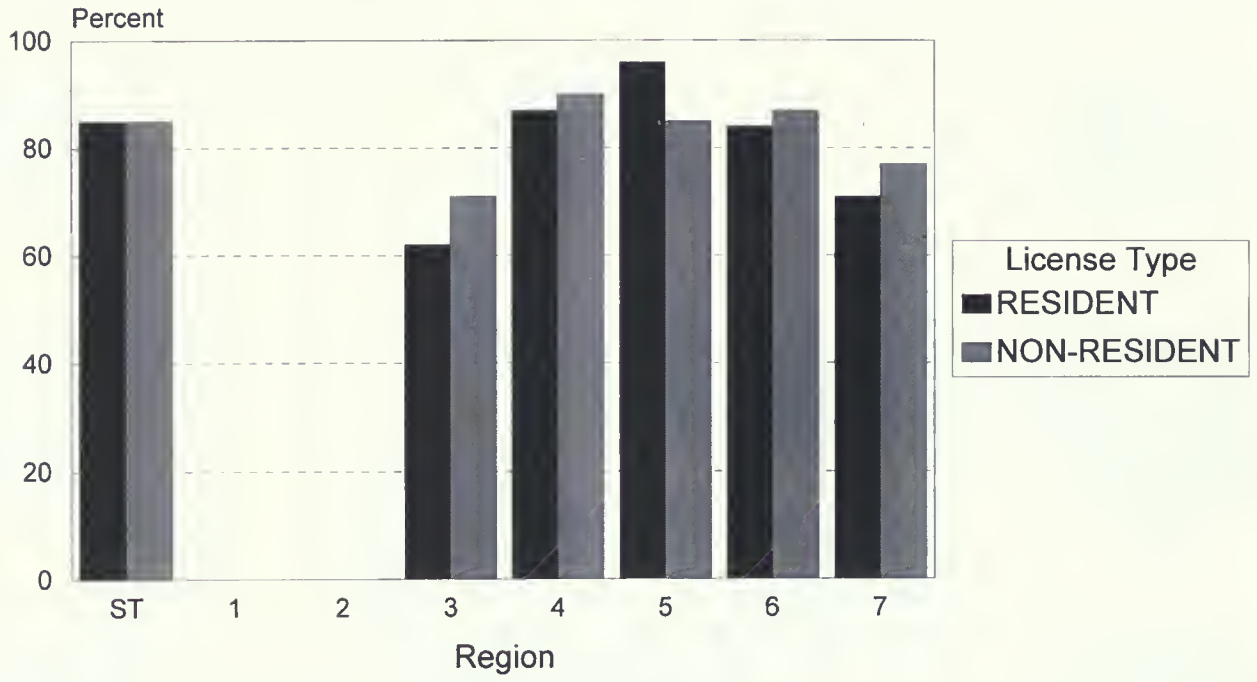


Figure 14. Multi-region Antlerless Whitetail Deer B License Harvest
Percent of Kill on Private Land



1993 MFWP Harvest Statistics

TRENDS IN LICENSE SALES:

Resident deer A license sales have remained relatively stable from 1984 - 1993 (Figure 15). Nonresident deer A license sales have been limited to 23,000 (17,000 Big Game Combination & 6,000 Deer Combination) since 1988.

Antlerless Deer B licenses have fluctuated widely over the period 1984 - 1993. In 1989, antlerless mule deer B licenses were available over-the-counter to both residents and nonresidents in some regions. The number of these licenses sold has steadily increased through 1993 with nonresidents purchasing a higher percentage of the licenses each year. In 1993 nonresidents purchased approximately 1/3 of these licenses.

Although the number of nonresident deer A licenses is limited to 23,000 annually, nonresidents are purchasing an increasing number of antlerless B licenses each year. This has resulted in an overall increase in nonresidents hunting deer particularly in eastern Montana (Figures 16 and 17). Although the additional nonresident antlerless harvest is necessary for population management, it may contribute to the already significant problem of hunter access.

Figure 15. Montana Deer License Sales. 1984-1994

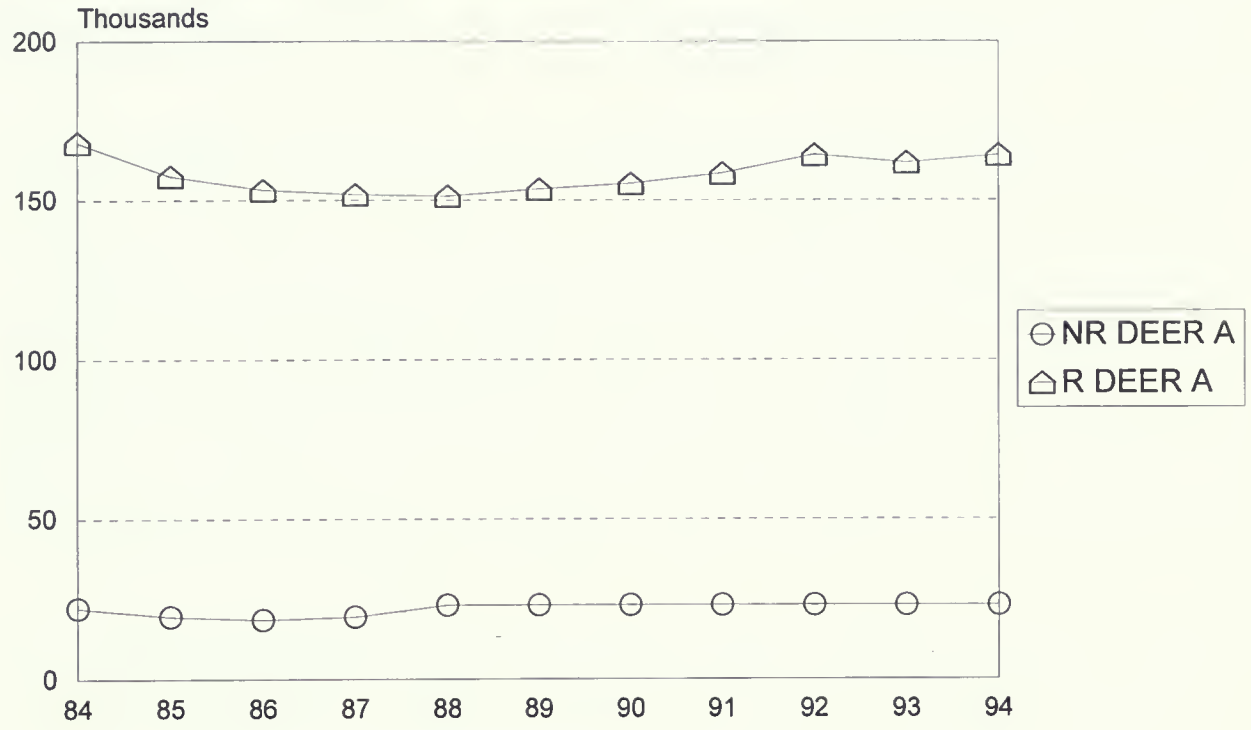


Figure 16. Ratio of Resident to Nonresident Deer Hunters.
Regions 1-3, 1977-1994

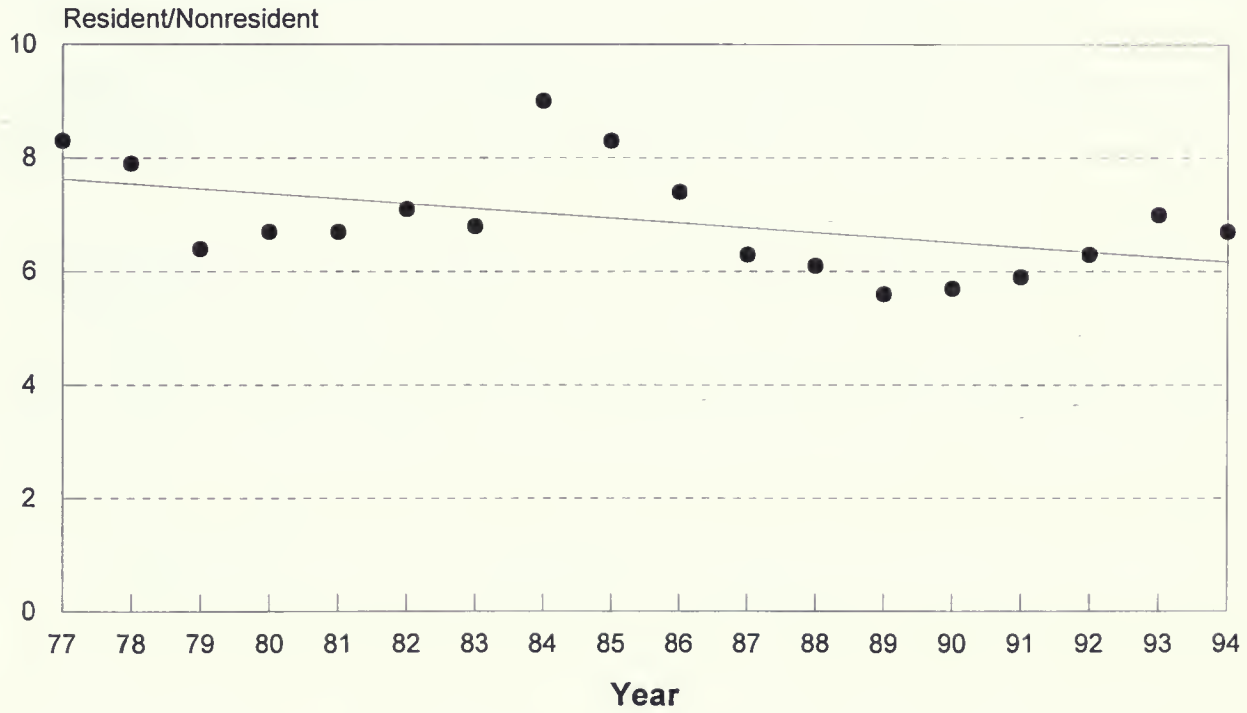
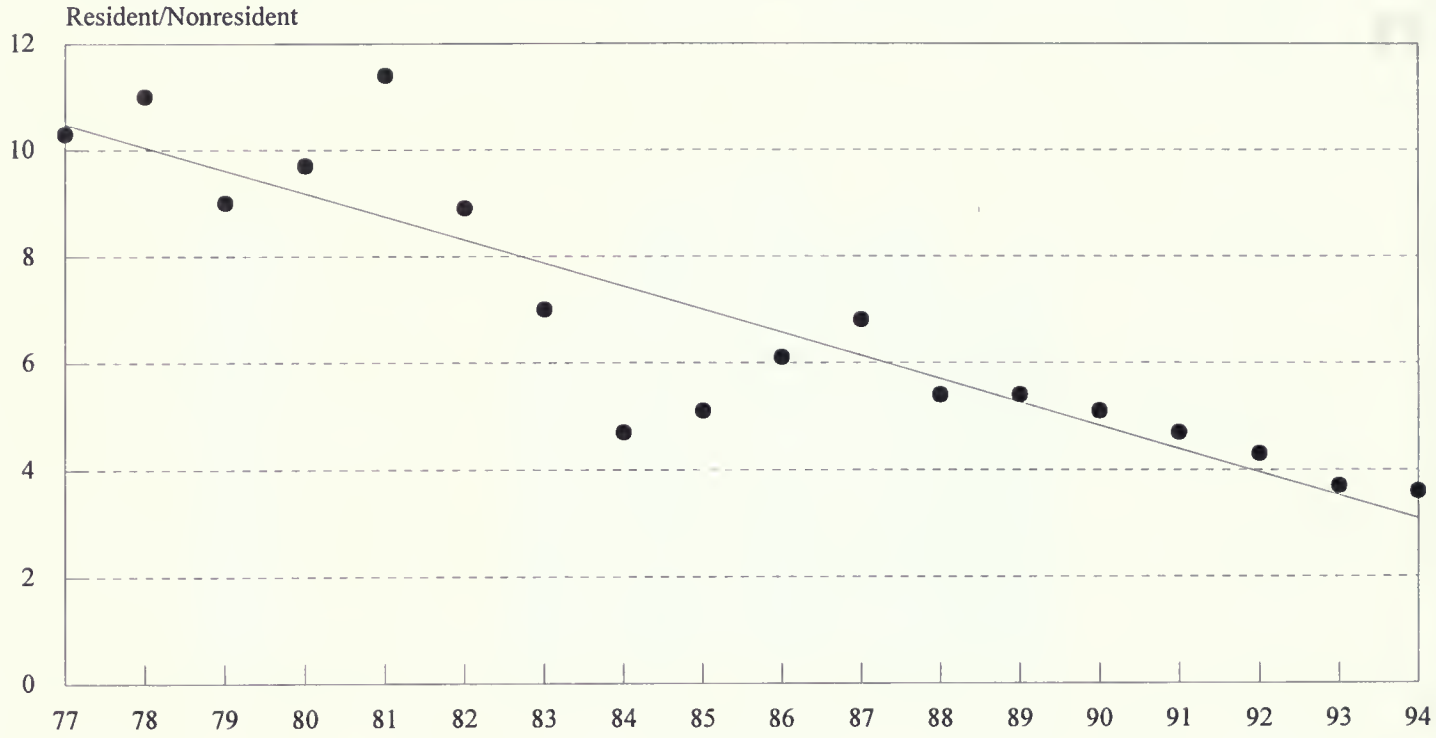


Figure 17. Ratio of Resident to Nonresident Deer Hunters
Regions 4-7, 1977-1994



HUNTER INFORMATION SECTION

Economic Value:

The net economic value of deer hunting in Montana was determined from a telephone survey of licensed hunters in January and February, 1986. The following information is from the final report (Brooks, 1988).

In 1985, resident deer hunters spent $55 per trip or $31 per day. Nonresidents, in contrast, spent $542 per trip or $86 per day. The net economic value for deer hunting in 1985 was $108 per trip. In other words, hunters would be willing to pay $108 more per trip than they actually do to be able to hunt at a given site.

Based on the 875,010 estimated hunter days in 1985, total expenditures by deer hunters in 1985 amounted to $63,875,730. Using recent hunter day information without adjusting for inflation would result in an estimate of $88,382,195 for 1993. Residents, on the average, took two hunting trips during the hunting season and traveled an average of 61 miles, while nonresidents took one trip and traveled 800 miles.

Hunter Description:

Following the 1988 general hunting season, another survey of licensed deer hunters was conducted to determine the characteristics of the Montana deer hunter. The following

excerpts were taken from a report of those findings published in 1990 (Duffield and Neher, 1990).

"People who hunt deer in Montana are a very heterogeneous group. Some travel 3,000 miles to hunt and others walk out their back door. Some spend $10 on a trip and others $2,000."

Hunters were grouped into four categories - residents, nonresidents, guided, and nonguided. The guided group was predominately nonresidents, since less than 1% of the residents hire a guide. "While the vast majority of all hunters were male, resident hunters had a lower percentage of males (85.5%) than did nonresidents (94.8%). Nonresidents and guided hunters spent significantly more time hunting deer each year than did residents" (18.39 days per nonresident, 20.12 days per guided, versus 10.73 days per resident and 11.56 days per nonguided). The survey also found that nonresidents were twice as likely as the resident and nonguided hunters to belong to a conservation organization (55.5% versus 24.4% and 27.9% respectively).

Deer hunters frequently hunt other big game species while hunting deer. Generally, this was more true for the nonresident hunters (28.3% killed other big game) and the guided hunters (40.7%), than the residents (15.9%), suggesting that a significant number of the guided hunters in the sample were primarily guided for other species, elk in particular. Table 4 from the survey report summarizes the information by species.

The survey also determined that hunting characteristics vary widely across FWP administrative regions. There are nearly twice as many hunters in Regions 1, 2, & 3 than in Regions 4, 5, 6, & 7 (Table 5). As stated earlier in the Trend in Hunter Numbers Section, density of hunters per square mile is also highest in these regions. Also, the number of deer observed is significantly higher in Regions 3, 4, 5, 6, & 7 than Regions 1 and 2.

In addition to grouping hunters by resident and nonresident, guided and nonguided, they can be described as four types - generalists-enthusiast hunters (27%), meat hunters (36%), generalists-meat hunters (14%), and trophy hunters (23%).

A description of each type follows:

Generalists-Enthusiast Hunters

These hunters seemed to enjoy nearly every aspect of the deer hunting trip. The three highest rated reasons which they gave for hunting were "for the meat," "for a chance at a big trophy," and "to test my hunting skills." Lowest importance to the group was having a special permit to hunt an area.

Table 7. Montana deer hunters percentage that killed other big game by species. Duffield et al, 1990.

Species	Residents	Nonresidents	Guided	Nonguided
Deer	63.9	68.8	62.7	65.1
Elk	9.2	17.4	27.2	9.6
Antelope	4.9	8.8	11.8	5.3
Bear	.2	.5	.5	.3
Other	1.6	1.6	1.2	1.7

Table 8. Montana deer hunting, characteristics by MFWP administrative region. Duffield et al, 1990.

Character-istic	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7
Percent Residents	85.0	86.7	81.2	82.9	87.4	85.2	72.2
Percent Guided	6.0	4.4	5.9	5.7	4.9	1.0	7.7
Percent Successful	58.6	55.6	53.3	68.6	4.9	1.0	7.7
Percent that killed other big game	8.3	19.6	26.9	16.2	10.8	24.8	80.5
No. Deer Seen	25.8	27.43	59.12	57.1	66.4	72.4	58.4
No. Days per Trip	5.8	5.31	5.79	4.35	3.47	4.37	4.55
No. Hunters Seen	10.05	10.66	13.47	8.51	4.63	7.95	6.52
Percent Bucks Killed	74.2	79.5	83.2	75.6	76.7	78.3	79.1
Sample Size	440	458	612	637	305	289	298

Meat Hunters

Hunters in this group seemed most interested in "getting in the meat," and doing this as inexpensively and easily as possible.

Generalists-Meat Hunters

This group seems to be opportunistic in their reasons for hunting. The two highest rated reasons given by this group were good road access to the area and because they had a special permit to hunt the area.

Trophy Hunters

These hunters were most interested in bagging a trophy buck and testing their skills along the way. Access, hunting close to home, and having an antlerless permit were all relatively unimportant to this group.

ACCESS

The future of Montana's deer populations and hunter use of those populations depends largely on the private landowner, because over 62% of the land occupied by deer is privately owned (Brown, 1978). Access to hunt deer on private land is paramount to controlling population levels and distribution, as well as providing hunting recreation. Although it is assumed that access for deer hunting is becoming more difficult, little definitive information is available to document that fact.

In 1975, a statewide analysis estimated that 40% of the private land with mule deer was closed or severely restricted to public deer hunting (Brown, 1978). This estimate was based upon the judgement of FWP personnel that lived and worked throughout the state at that time.

In 1993, a Montana Farm and Ranch survey was mailed to a random sample of 2,200 of the 14,067 commercial farms and ranches in Montana included in the Montana Agricultural Statistics Service data base (Irby, et al. 1995). The survey covered the 1992 growing season and the 1992-93 winter. Some of the highlights of the survey which relate to hunting access were:

1) White-tailed deer were noted as present by 81% of the respondents, mule deer by 76%.

2) More than 60% of the respondents were satisfied with current numbers.

3) When asked about damage levels over the time they had operated their farm or ranch, 68% felt that the financial damage to their operation due to big game was

seldom serious. Twenty-five percent indicated that it was serious in some years, and 8% indicated it was serious in most years.

4) Eighty-four percent of the respondents with wild ungulates on their property stated that they permitted some form of hunting. On the average, these operators permitted hunting on 65% of their land. Almost all of the respondents that permitted hunting said they allowed family and friends to hunt, 90% allowed the general public to hunt, and only 8% of these landowners indicated they charged fees or leased hunting rights to outfitters.

5) Ten percent of the respondents said they closed all or some land to hunting; 49% indicated they encouraged hunting.

6) Approximately 12% indicated they used the assistance from Montana Fish, Wildlife & Parks.

7) Those respondents reporting damage were less likely to close lands to hunting than those who did not report damage.

8) Regionally, southwestern Montana had the highest frequency of respondents who felt damage was serious in most years and the highest frequency of respondents who felt levels of elk and deer were too high.

9) The highest reported closure of land to hunting (19%) was in the northwestern region (Table 6).

10) Central Montana had the highest frequency of fee hunting (Table 7).

Table 9. Distribution of responses (percentages in tables with n in parentheses) from four geographic regions in Montana to questionson management strategies for wild ungulates. Irby, et al, 1995.

	Number of "yes" responses in			
QUESTION	NW	SW	Cent.	East
1. Closed to all or part of property to hunting[1]	19 (n=102)	8 (n=117)	10 (n=378)	7 (n=389
2. Placed restrictions on hunting	46 (n=102)	40 (n=116)	46 (n=379)	37 (n=389)
3. Encourage hunting	34 (n=102)	56 (n=117)	50 (n=378)	48 (n=387)
4. Asked Montana Fish, Wildlife and Parks for assistance.	15 (n=102)	27 (n=117)	10 (n=379)	9 (n=389)

[1]Regions differ significantly ($p<0.05$; Chi-square likelihood ratio = 10.7, 11.8 and 27.0 for questions 1, 2 and 3 respectively.

Table 10. Frequency of hunting access anf fee hunting, percentage of land open to hunting, and estimated number of animals killed per operation that allows hunting by geographic region in Montana. Irby, et al, 1995.

Access Aspect	Northwest	Southwest	Central	East
Percent of respondents who permit public hunting (including fee hunting)	68	86	84	89
No. of respondents who permit public hunting (including fee hunting	85	96	341	370
Of respondents who permit public hunting:				
Percent who charge fees or lease to outfitters	4	10	12	8
Percent of land managed by respondents who allowed public hunting that was open to hunting	50	68	66	56
Estimated percentage of total private agricultural land in region open to public hunting (including fee hunting)[1]	35	62	61	52
Mean number of animals reported killed per farm or ranch open to hunting.[2]	9	24	18	17

[1]Total ha open to hunting/total ha controlled by respondents x 100.

[2]Includes the 36% of respondents who indicated no animals were killed even though their property was open to hunting.

To document the current situation of hunting access to private lands MFWP personnel were asked to provide an estimate of public access to private lands by hunting district in four categories: open, closed, restricted, and outfitted/leased. The definition for each category is described as follows:

Open: General public can hunt, numbers may be restricted at times but landowner provides reasonable free public access;

Closed: Landowner allows no hunting or only family members and close friends allowed;

Restricted: Landowner restricts public access more than considered reasonable, usually the restrictions are severe enough to make hunting ineffective in control of deer population levels;

Outfitted/Leased: Landowner outfits or has hired an outfitter, leases to a group or individual, or charges a fee.

Similar to the results from the 1993 Montana Farm and Ranch Survey, northwest Montana, an area with little private land, had the highest percentage of private land closed to hunting (Most districts 50% or more closed) (Appendix I) (Figure 18). Region Two in southwestern Montana west of the divide also had several districts with private land closures of greater than 50%. The lowest percentages of closed private land were recorded in eastern Montana (Regions 6 & 7 - 20% or less in all districts).

Districts with high percentages of outfitted/leased private land were most frequent in southeastern Montana (Region 7). Hunting districts 704 and 705, primarily Custer, Powder River, Fallon and Carter Counties, were 54% and 79% outfitted/leased respectively. Low percentages of outfitted/leased were recorded in western Montana (Regions 1 & 2).

Comparing the results of the 1992 Farm and Ranch Survey with the estimate of land access status indicates that although there appears to be a trend toward more restricted access, most landowners continue to permit hunting. Also, there is a direct relationship between the magnitude of game damage perceived by the landowner and the amount of public access allowed.

Another indicator of access restrictions should be deer harvest. If access becomes overly restrictive, there should be a decline in harvest, especially antlerless harvest. Current harvest records do not show a decline.

The hunting districts with severe closures and restrictions seem to cluster together in certain areas of the state. This may be indicative of a snowballing effect of closures caused by increased numbers of hunters looking for access adjacent to areas that they have traditionally hunted. Landowners may be forced to other restrictive means of controlling hunters because of the shifting that occurs. If this is so, solutions to the access problem will need to include a means of preventing this shift of hunters and/or provide for a wider distribution of lands open to hunting in order to disperse hunters.

RESULTS OF SPECIAL HUNTING SEASON TYPES & MANAGEMENT STRATEGIES

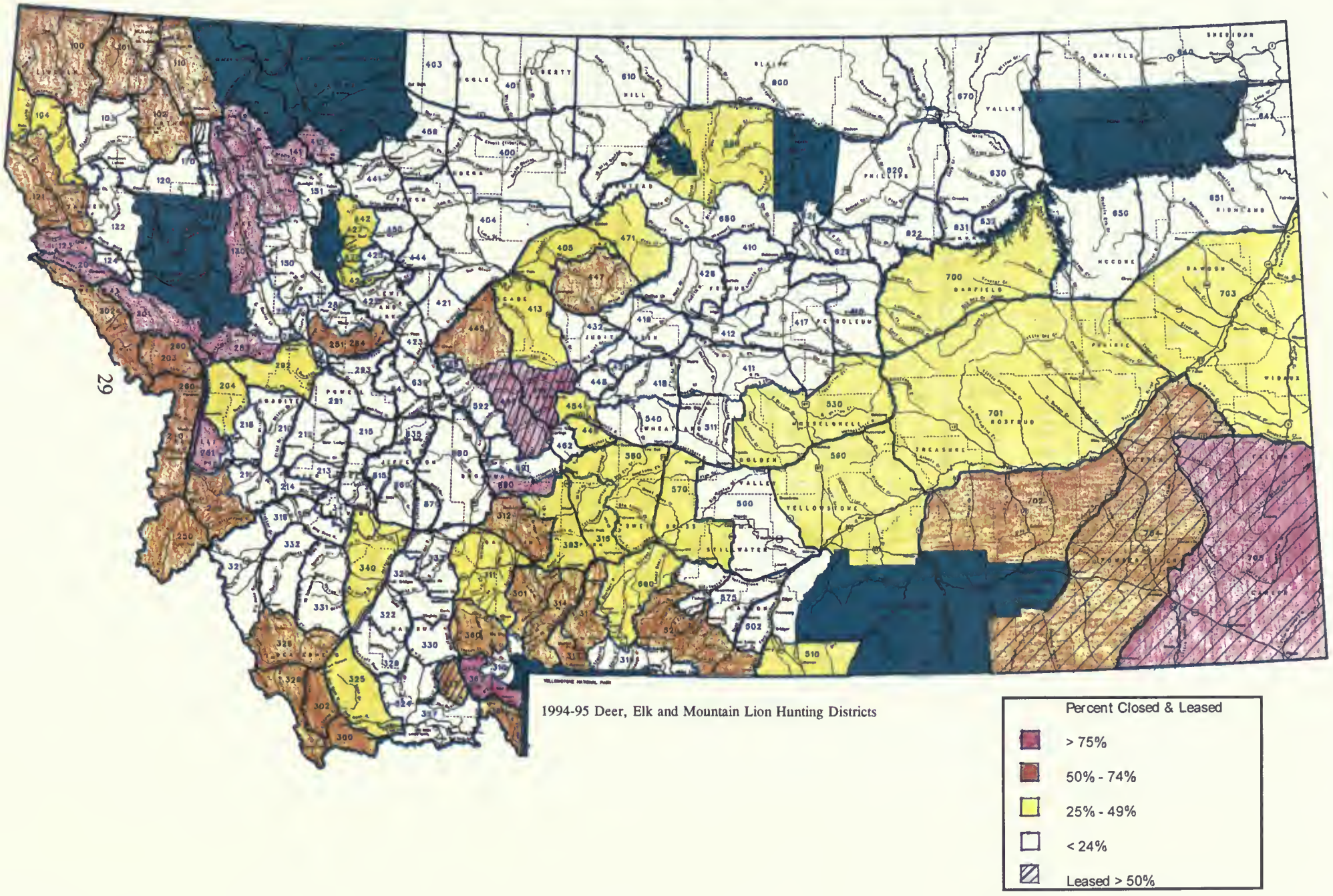
In recent years, various hunting season types have been implemented to resolve management problems and/or in response to demands by hunters for certain types of hunting experiences. Many of these season types have now been in place long enough to determine what resulted and how that might compare to what was perceived when the action was first taken.

Season Types:

I. Antlered Buck Mule Deer - 2 point or less for last two weeks of season

Purpose: This season type was initiated in the Bridger Mtns. (HD 312) in 1989 as an attempt to restore the opportunity to kill large mule deer bucks.

Figure 18. Percent of Private Lands Closed or Leased for Mule Deer Hunting. 1994.



One of the goals was to maintain 25 bucks/100 does in the post-season population.

Background: The Northwest Slope mule deer population on the west slope of the Bridger Mountains provides one of the best long term data sets in Montana for describing trends in the mule deer buck segment. This population occupies rugged, heavily timbered, high mountain country and represents a favorite location to hunt big bucks in the Bozeman area. In the last 20 years, hunting pressure has intensified in this area. Portions of the habitat are now more accessible because of logging roads and removal of forest cover.

Significant numbers of large bucks occurred in this population in the early to mid-1970s. Beginning in 1977, numbers of larger bucks began a steady decline continuing to very low levels in the mid-1980s. When large bucks hit rock bottom in 1986, we estimated that buck hunters would have to spend seven or eight days afield before observing a single four-point buck. Twelve years earlier, when large bucks were at a peak of abundance, a hunter could observe three four-point bucks in a single day.

Results: The two-point season began in 1989 to restore the opportunity for hunters to kill large mule deer bucks in HD 312. The ratio of 4 pt bucks/100 does increased from 2:100 to 7:100 during 1989-1991. Initially this appeared to be an encouraging trend. However, four point ratios again declined during 1992-1994 to only slightly better than the mid-1980s at less than 1 4pt buck/100 does). Since 1989 the buck:doe ratio has averaged 19:100 with only one year (1992) that exceeded the goal of 25 bucks:100 does.

The age structure of the harvest followed a similar pattern to the buck:doe ratios. A much higher percentage of older bucks (five years and older) were killed in HD 312 in 1991-1992 as a result of lower rates of hunter harvest during the first few years of the two-point season and because of above average fawn survival. During 1993-1994 percentages of five years and older bucks in the harvest declined in HD 312 to a level similar to HD 393, where the population is under a consistently high level of exploitation and the bulk of the post-season population consists of yearlings.

Managing for an improvement in availability of older mule deer bucks is a challenging endeavor considering the significant natural losses that occur in the male segment of mountain-foothill mule deer populations. During 1990-1994, annual samples of six to eight-month-old radio-collared male fawns have exhibited mortality rates of 52, 35, 39, 78, and 38 percent during the January - June period of those years, respectively. Cause of death was predominately predation and winter malnutrition.

Conclusion:

1) The 2-point season has <u>not</u> provided a sustained improvement in post-season buck:doe ratios. In only one of six years did the ratio exceed the stated goal of 25 bucks:100 does.

2) Hunters are able to accomplish a significant harvest (50-65%) of mature (2 1/2+ years) bucks during the first three weeks of the season when weather conditions are even moderately favorable for successful hunting. This occurred during three of the last six years which diminished recruitment into age classes four and older. This has held the population below the stated management goal of maintaining 40% of the harvest in age classes greater or equal to four years during five of the last six years.

3) Illegal kill of mature bucks during the last two weeks represents an additional 18% of the legal harvest.

4) Natural mortality of bucks six months and older is a significant factor in mountain ecosystems that is contributing to low buck:doe ratios.

II. Four Point Buck Regulation

Purpose: A four point mule deer buck regulation was initiated in HDs 320, 333, & 329 in 1986 at the request of hunters. Hunters wanted to increase their opportunities to take a larger buck by restricting hunters to only 4 point or larger deer.

Background: HD302 was used as a control to compare with HD329, because its lower security is similar to that of HD329. HDs 331 and 312 were used as controls to compare with HDs 320 and 333, since they exhibited higher habitat security similar to those districts.

Results:

1) Increased post-hunting season buck/doe ratios: HD 329 increased from an average of 5.4 bucks/100 does during four years prior to the 4 point regulation to an average of 8.4 the four years after the regulation (Figure 19). In HD 302 (control) the average buck/doe ratio stayed essentially the same during the same time period (8.4 to 8.6 - Figure 19).

2) Importance of Habitat Security: Even with the increase in the post-season buck/doe ratio in HD 329 (5.4 to 8.4/100) due to the 4-point regulation, the ratio of bucks/100 does in that district remained below the ratio found in hunting districts exhibiting greater habitat security. An example is HD 331, which had an "any antlered buck" regulation (15/100).

3) Increased 4 - point harvest: The 4-point kill combined for the three 4-point hunting districts increased from 318 bucks in 1985 to 583 in 1988. The 4-point kill decreased in the three combined "any antlered buck" hunting districts from 510 to 455 during the same period (Figure 20).

Figure 19. Post-hunting Season Buck/Doe Ratios

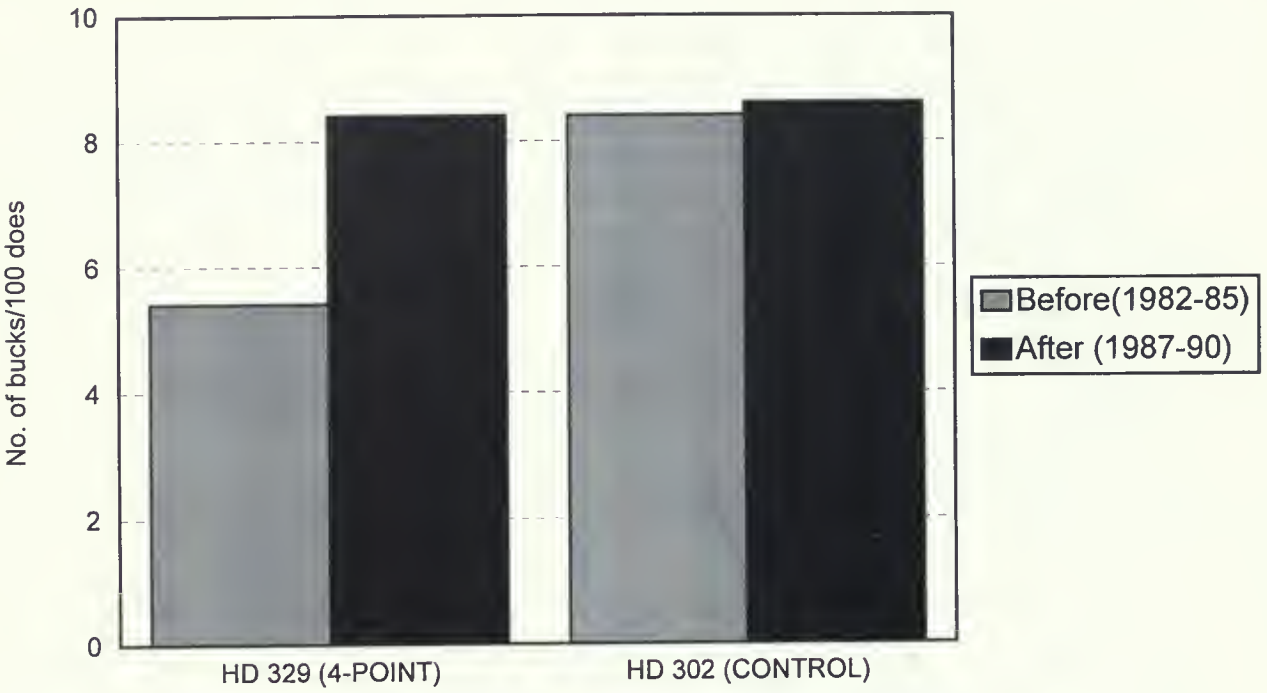
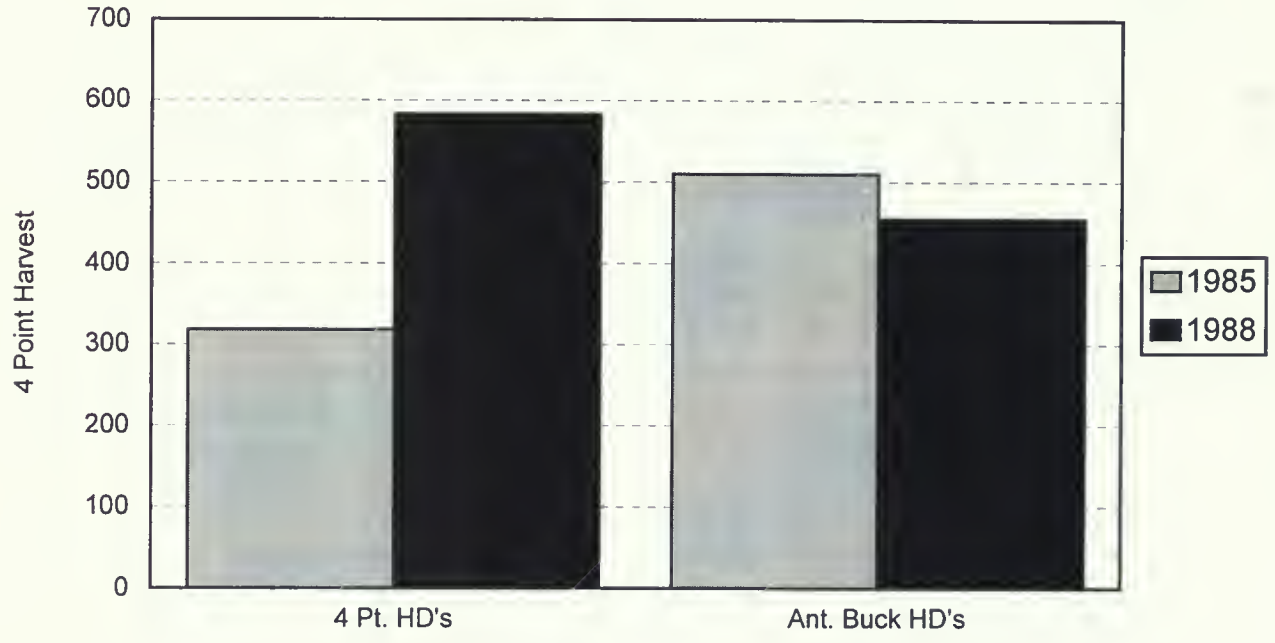


Figure 20. 4-Point Buck Harvest



4) Decreased total buck harvest: In 1985 for the three 4-point districts combined, the total mule deer buck harvest was 892 animals. In 1988, the legal 4-point harvest was reported at 583 animals (35% fewer 4-point bucks than before the 4-point regulation).

5) High yearling buck mortality: Even though yearling bucks were protected by the 4-point regulation, survival through the hunting season was significantly less than 100%. In HD 329, there were 61% fewer yearling males on the winter range after the hunting season than projected to be there. The survival was better in the more secure Tobacco Root Mountains (HD 333 = 37% fewer yearlings and HD 320 = 22% fewer).

6) No Major Increase in 4-point bucks: Out of 1,438 deer surveyed after the 1988 hunting season in the three 4-point areas, only 5 (3%) of the 149 bucks observed had four points.

III. Permit Only Buck Mule Deer Season

Purpose: Permit only buck mule deer seasons were initiated in HDs 291, 441, 530, & 650 to increase the availability of larger bucks for hunters, improve the post season buck/doe ratio and improve the buck age structure.

General Description: The four hunting districts occur in markedly different habitat types. The varying weather conditions, deer population characteristics, hunter numbers, and other factors unique to each area are reflected in the results observed under the permit only season. HD291 291 is in the East Garnet Mountain Range north of Drummond and Avon, west of the continental divide in mountain foothill habitat. HD441 lies along the east face of the Rocky Mountains in Teton and Pondera Counties where deer migrate from the Bob Marshall Wilderness to the foothill zone along the east face of the mountains to winter. HD530 is a very large district in central Montana near Roundup. Within the district, there are six distinct habitats: low lying mountains, riparian/agriculture, agricultural/prairie, ponderosa pine breaks, native prairie grasslands, and breaks. HD650 is in northeastern Montana includes sagebrush/grassland, native prairie, breaks and riparian habitats.

HD291:

Background: Landowners and hunters believe that this hunting district historically provided large numbers of mature buck mule deer during the hunting season. As hunting pressure increased in this low security habitat, buck/doe ratios declined to only 3-4 bucks per 100 does post-season. Although the production and survival of fawns remained good, a growing number of hunters expressed concern about the high percentage of yearling and low numbers of mature bucks harvested. As a result, the department implemented a buck hunting by permit only season (50 permits) following the first week of the general either-sex hunting during 1986. The objective of this regulation was to increase the average age of bucks in the population and increase the post-season buck/doe ratio to 20 bucks/100 does. Retaining one

week of either-sex hunting at the beginning of the general five week season was intended to mediate the loss of hunting opportunity, and keep hunters from shifting to other areas at least during the first week of the season when the highest numbers of hunters were in the field. At the same time, antlerless B licenses were increased to control population increases. An adjacent district (292) was used as a control to make comparisons.

Results: Following the first year of permit hunting, nearly twice as many deer and four times as many bucks (mostly yearlings) were observed in post season surveys. The ratio of bucks/100 does increased to 15. Increases in total deer and numbers of bucks also occurred in the control area (HD 292)(5-6 bucks/100 does), but not to the degree of that observed in HD291. After three seasons of permit hunting, a buck/doe ratio of 22/100 was observed and numbers of adult bucks were the highest observed to date (80 versus 4-8 prior to 1986). In the control area (292), the total number of deer increased as did the number of bucks; however, the majority of the increase was in yearling bucks, and few mature bucks were observed. The buck/doe ratio remained at five.

Since 1988, the post season buck/doe ratio in HD291 has declined to 13 bucks/100 does. This was caused by the season structure which allowed anyone with a deer A license to hunt the first week due to the perception that there was a better chance of harvesting an older buck.

During the 1986 season, hunter numbers in HD 291 decreased by 10%, while numbers in HD 292 increased by 19%. This might suggest a displacement of hunters as a result of the restrictive buck season in HD 291. However, during 1987, hunter numbers in HD291 increased by 55% over 1986. This may be explained by the fact that one hundred antlerless B tags were issued for the first time during 1987 or hunters may be responding to improved chances of harvesting an older buck during the first week of the season. Conversely, hunter numbers in HD 292 dropped 9% during 1987. With the exception of the 1993 season in HD 291, hunter numbers have increased slightly in each district since 1988.

Although sample sizes of hunter killed deer incisors are small, the average age of bucks harvested did increase from 2.4 in 1986 to 4.1 in 1993.

HD 530:
Background: A low cycle of deer numbers in 1986 along with post-season buck/doe ratios as low as 4/100, prompted concern from sportsmen. In response to those concerns, HD 530 regulations were changed in 1987 from an antlered mule deer season open to anyone with a general A deer license to one which restricted mule deer buck hunting to only hunters with a special permit. The objective was to maintain a post-season buck/doe ratio of 20-25/100. The number of buck permits issued was limited to only 200 the first year. Since that time, permit levels have increased and in 1992, 1500 were issued. Success based on permits issued was only 10% the first year, but has fluctuated between 22 and 28% since then.

Results: Following initiation of the buck permit season, the post hunting season buck/doe ratio increased significantly and remained higher than other prairie areas in southcentral Montana (region 5). Since 1987, the mean for prairie areas was 13 bucks/100 does post-season while that for HD530 was 28. The age structure of mule deer bucks in HD530 also changed over the eight years since the permit season was established. Ninety-three percent of all hunter killed bucks from prairie areas in Region 5 other than HD530, were 1 1/2 to 3 1/2 years old. In HD530 only 71% of bucks were 1 1/2 to 3 1/2 years old. During this same period, the general age structure of all prairie areas did improve (e.g. prior to 1987 67% of the bucks aged were 1.5, compared to 56% after 1987), but not to the extent of that recorded in HD530.

The number of hunters hunting in HD530 has declined 1.8% below that level observed prior to implementing the permit only season. It is estimated that 2208 less total hunters over six years or 368 less hunters per year are now hunting in HD530 than would be under the standard either-sex season. Since total hunter numbers statewide have not decreased, these hunters more than likely have shifted to other areas increasing hunting pressure in those districts. This translates into an even greater loss in hunter days (7,191 days for the six years, 1988 - 1993).

Although the season type reduced hunter opportunity, it only slightly reduced the deer harvest over the six years; approximately 793 less deer than would have been harvested under the either-sex season. The decrease in buck harvest and increased age structure has increased the number of 4 points in the harvest from 29% to 57% over the seven year period (1987 -1994). As a comparison, the number of 4 points in the Region 5 harvest increased from 25% to 43% during the same period.

Illegal harvest continues to be significant in HD530. Reported illegal harvest was 91% of the total buck kill the first year and has declined to 40-41% the last two years. This has occurred despite a concerted effort to sign the area as permit only.

HD 650:
Background: A special mule deer buck permit area was initiated during 1987 in a 287 square mile portion of HD650 at the request of sportsmen. The intent of the season was to increase the number and size of bucks. An evaluation of this season was made utilizing information gathered from 1990 through 1995.

Results: The number of bucks observed on post-season surveys has increased since 1991. This has occurred during a period when buck numbers in other survey locations have remained the same or declined. Post-season buck/doe ratios have increased from 21 in 1991 to 113 in 1995. The ratio, however, was greatly influenced by a decrease in the doe segment during the same time.

Antler measurements of 141 bucks taken by permit holders did not increase during the 1990 - 1994 period (both main beam length and inside spread averaged 20 inches). Although these

measurements did not differ significantly from those recorded at taxidermists, they were larger than those recorded from the Havre Check Station where the main beam spread and length for over 2100 mule deer bucks was 13 and 14 inches respectively. It is important to note that the Havre check station information included all age classes while the HD 650 information was taken from bucks which were primarily 3 - 5 years of age. Annual variations in antler measurements were noted within age groups as well as between years. Antler growth peaked once deer reached four years of age. Based upon data gathered from hunter killed deer held by taxidermists and those inspected in the field, deer taken in HD 650 were no older or larger than some of the deer taken in other areas of Region 6.

Competition for the 200 permits steadily increased and then leveled off the last two years (151 applicants in 1987 and 1188 in 1994). Local residents from Region 6 draw approximately 50% of the permits.

HD 441:
Background: HD 441 lies along the east face of the Rocky Mountains in Teton and Pondera Counties. Winter range for mule deer lies primarily on private lands along the narrow foothill zone immediately east of the Front Range. Traditionally, buck deer were readily available to hunters only if early migrations occurred out of the Bob Marshall Wilderness, perhaps in three out of ten years. In 1984, due to early winter weather, mule deer were present in large numbers on the winter range, creating an ideal situation for a significant harvest. Complaints from sportspersons and landowners prompted the department to initiate a change in harvest strategies. After a three year period of varying strategies, the season type became a three week antlered buck followed by permit only buck hunting for two weeks. The permit only time period coincided with the beginning of the rut and when weather conditions generally force deer to the private land winter ranges.

Results: Variations in numbers of deer seen on post-season surveys were directly correlated with weather conditions, which not only affect deer migration but also influence observability. Actual numbers observed varied from an average of 1,823 from 1979 - 1986 to an average of 2,400 from 1987 - 1995.

The number of post-season bucks/100 does rose from a low below 10 in 1986 to a high above 40 in 1992. Since 1992, the number has declined with fewer than 20 bucks/100 does recorded in 1995. The total number of deer observed also declined the last two years. Fawn production has remained fairly stable with a minor drop during 1991-92, just before the drop in total deer was observed.

Total numbers of bucks harvested as well as those bucks older than yearlings increased significantly through 1992. Since that time the harvest has declined along with the post-season buck/doe ratios.

Comparisons with adjacent HD442, where hunting of antlered bucks is not restricted by permit, revealed that limiting opportunity for buck hunting during the rut on winter range in

HD441 probably accounts for the observed 14% decline in total buck harvest compared to earlier years. The number of 4 point bucks in the harvest increased in HD441 (1985-89, 52% were 4-point or greater; 1990-93, 70% were 4-point or greater). Using HD442 as a comparison, 55% of the bucks harvested were 4-point or greater during 1985-89, and 48% from 1990-93, a decrease of 7%. Hunter success increased by 13% in 441 and 8% in HD442 and hunter days increased by 58% in HD441 and 17% in HD442. Numbers of hunters increased by 49% in HD441 and 2% in HD442.

In general, under the permit season, mule deer numbers, total harvest, buck harvest, percent 4 points harvested, hunter success, hunter days, and number of hunters all increased in 441. During this same period, only the percent bucks harvested, hunter days and number of hunters increased in HD442 (Table 8).

IV. Season Ending November 15

Purpose: A three week buck mule deer season, ending on November 15, was established HDs 204, 240, 250, 261, and 270 in 1992. The early closure was intended to end the hunt before the rut. However, it should be noted that the rut begins as early as November 1, at a time when most deer in this area have already migrated to their winter ranges.

Results: The buck harvest dropped the first two years but increased again in 1994 once hunters learned that the rut was on and the bucks were vulnerable at low elevations. Mule deer classifications post-season also followed a similar pattern. In 1992, the buck/doe ratio increased to 9.5/100 from the previous four year average of 6.4/100. In 1993 the ratio again increased to 11.6/100. In 1994, with the increase in harvest, the ratio declined

Table 11. Mule Deer Hunting Season Comparison, HD 441-442.

Percentage change: 1979-86 and 1987-93

	H.D. 441	H.D. 442
Total Harvest	+49%	-32%
Buck Harvest	+42%	-32%
% Bucks Harvested	-14%	+1%
% 4 Pt or >	+18%	-8%
Hunter Success	+13%	-8%
Hunter Days	+58%	+17%
Hunters	+49%	+2%

to 8.1/100. The results from this area indicate the hunting season would need to end about October 25 to reduce the vulnerability of bucks during the rut.

V. Three Week vs Five Week Season in Northeast(R-6)

Purpose: Although most hunting districts in northeastern Montana (Region 6) are five weeks long, four districts had three week seasons prior to 1988. The three week season was intended to reduce harvest during a time when populations were low.

Results: Harvest information from those districts with a 5-week season was compared to harvest information from those with a 3-week season within the region. Hunter success averaged 60% with no significant difference between areas. There was also no significant difference in the percent of whitetail or mule deer bucks in the resident harvest between areas. There were minimal differences in the percent 5x5 or greater whitetail bucks between the 3-week hunting districts and the 5-week districts but the difference was not significant. Percent of 4x4 or greater mule deer bucks averaged 43 in the 3-week districts and 47 in the 5-week districts, with no significant difference.

In summary, there was no significant difference noted between the 3 and 5 week seasons in northeastern Montana based upon harvest statistics. The relatively low security in these habitats results in the kill being primarily controlled by hunter effort.

RESULTS FROM OTHERS STATES

Antler-point Restrictions:
Antler-point restrictions (APR) for mule deer have been used in several states, including California, Oregon, Utah, and Wyoming. The general conclusion from most applications was that APR delayed harvest of bucks until they were 2-years old and, with unlimited hunting pressure, few bucks lived beyond three years of age because all hunting pressure was directed at the older age classes.

Colorado:
The following information was reported by Colorado in April 1993 in a report entitled "Deer and Elk Management Analysis Guide, 1992-94." In 1986, an antler point restriction (APR) was implemented for mule deer hunting in Colorado, limiting hunters to harvest bucks with three or more antler-points during some seasons.

The analysis of the effect of APR (3 point antler restriction) was limited to changes in post-season deer sex ratios. These data were acknowledged to be relatively insensitive to changes actually occurring in the deer populations because of their high variability due to factors affecting observability and fluctuations in populations related to weather and other factors.

In the Southwest Region where APR was included in all three deer seasons, total post-season buck:doe ratios steadily increased from 9:100 in 1985 to a high of 19:100, but did not surpass the observed high recorded prior to the implementation of APR (20:100). Adult bucks comprised 48% of the bucks prior to APR and 30-48% during APR.

In the Southwest Region where APR was included in two seasons, total post-season buck:doe ratios fluctuated from 12-16:100 during APR, and remained below the 18:100 observed prior to APR. Adult bucks comprised 58% of the bucks prior to APR and 38-61% during APR.

In the Northwest Region (two seasons), total buck:doe ratios increased from 16:100 in 1985 to 18-23:100 during APR, but did not surpass the 25:100 observed prior to APR. Ratios of mature bucks/does were variable and not greater than 4:100.

In summary, the 1993 Colorado report states "data suggest that APR were associated with correcting acutely depressed ratios but over time, APR did not increase total or adult buck:doe ratios to pre APR levels."

Two Point Mule Deer Buck Seasons:

Idaho:
In three hunting units in Idaho, general 2-point mule deer buck seasons with limited entry seasons for mature bucks were implemented in 1991 to reduce hunter crowding and increase numbers of mature bucks. Since the start of the 2-point regulation, more mature bucks have been seen following the season. It will be several more years before a final evaluation can be made, but an increase in numbers of large 4-point bucks was reported.

No significant illegal hunting mortality of larger bucks was observed. It was noted, however, that hunter numbers dropped over half and harvest declined by 1/3 to 2/3 over three years. Hunter success for the limited entry mature buck season, which followed the 2-point season, ranged from 68% - 88% over three years.

Shorter Deer Seasons:

Colorado:
First three days buck only in current 5, 12, and 9 day deer seasons:

Limiting buck hunting to only three days in 1992 resulted in a large proportion of the deer hunters not hunting. Among resident deer hunters who had purchased licenses in 1991, only 59% bought a three day buck deer license for 1992. Of nonresidents who had purchased a license in 1991, only 35% bought a three day buck deer license in 1992.

One half of the deer hunters who did not participate in the three day buck season reported that they substituted another hunting activity (ie. elk, birds, etc.). Family obligations was the major factor causing residents not to participate while time available for hunting was the factor cited by nonresidents. Hunter satisfaction with their deer hunting experience dropped for residents from 45% to 28%. For nonresidents the satisfaction also declined from 55% to 23%.

Early (pre-rut) seasons:

Idaho:
In 1988, Idaho conducted a survey to determine deer hunter preferences. The survey determined there were very few "meat" hunters and also few "trophy" hunters. The majority of hunters hunted for the hunting experience, such as, being with friends at a hunting camp and not running into other hunters. They wanted a chance to get an older buck and they wanted older bucks in the population. Harvest information indicated the percent of bucks with four or more points in the harvest increased from 22% the first week of the season (Oct. 18-25) to 39% the last week (Nov. 6-15). The harvest of older mule deer bucks increased significantly in November.

As a result of these findings, Idaho implemented an earlier deer season in 1991, beginning October 5 and ending October 29. The elk season began later on October 15 and ended November 8. A cap of 100,000 elk license was also imposed. The purpose of the season structure was to remove the hunting season on deer from the rut to allow more bucks to survive the hunting season resulting in more older bucks in the population.

Initially, post-season buck/doe ratios increased, however, hunters have become more successful in recent years, reducing the benefits initially observed. (Lonn Kuck, Idaho Fish and Game, pers. comm.).

Wyoming:
Wyoming's mule deer season begins October 1 and ends about October 25. Buck/doe ratios ranging from a minimum of 15/100 to 45/100 have been established as management objectives. Observed buck/doe ratios have been within the management objectives established during most years.

Information from post-season aerial classification surveys in the Wyoming Range Deer Herd Unit (Region G) shows mature bucks representing 50 - 86% of the buck component from 1988-1994. Buck/doe ratios have ranged from 30/100 to 50/100 for the same period.

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Appendix 1. Mule Deer Hunting Access on Private Land.

Hntg Dstct	Sq Mls	%Private	%Open	%Restricted	%Leased	%Closed
100	1395	7	49	0	0	51
101	836	21	2	48	0	50
102	624	38	26	18	6	50
103	945	56	91	0	0	9
104	677	18	68	0	0	32
110	812	16	19	31	0	50
120	505	70	75	0	0	25
121	945	6	39	0	tr	61
122	715	39	79	0	0	21
123	238	10	0	0	0	100
124	143	33	46	0	0	54
130	623	10		0	0	100
132	246	60		0	0	100
140	677	3		0	0	100
141	382	3		0	0	100
150	800	0	-	-	-	-
151	364	0	-	-	-	-
170	164	97	<10	<40	0	>40

Region 2

Htng Dist.	Sq. Miles	%Private	$Open	%Restricted	%Leased	%Closed
200	235	12	15	10	0	75
201	522	38	5	20	0	75
202	733	11	44	5	1	50
203	455	51	5	24	1	70
204	430	48	60	0	5	35
210	372	42	24	66	5	4
211	319	8	0	100	0	0
212	549	37	68	32	0	0
213	245	67	72	13	0	15
214	202	75	69	31	0	0
215	596	55	38	62	0	0
216	392	8	100	0	0	0
240	586	23	50	0	0	50
250	699	5	50	0	0	50
260	140	94	6	17	2	75
261	287	51	10	5	0	85
270	573	18	0	50	25	25
280	319	0	na	na	na	na
281	375	32	10	40	0	50
282/ 285	570	44	88	0	0	12
283	364	64	4	15	1	80
284	16	88	13	73	8	6
290	62	94	66	26	1	7
291	330	81	66	18	8	8
292	572	71	67	4	2	27
293	493	36	91	6	2	1

Region 3

Hntg	Sq	%Private	%Open	%Restricted	%Leased	%Closed
300	422	25	34	0	0	66
301	426	19	50	0	0	50
302	316	20	45	0	25	30
310	227	14	92	0	0	8
311	869	77	65	0	25	10
312	520	79	20	20	20	40
313	180	15	15	11	26	30
314	520	56	5	9	41	22
315	611	67	12	16	10	15
316	476	1				
317	422	30	15	5	2	54
319	449	25	85	10	0	5
320	419	nd	75	18	5	2
321	794	25	70	10	5	15
322	309	nd	2	75	18	5
323	190	nd	0	50	50	0
324	470	nd	85	5	5	5
325	745	nd	5	60	30	5
326	405	nd	2	75	18	5
327	597	nd	60	30	5	5
328	483	35	30	0	10	60
329	684	35	30	0	20	50
330	327	nd	35	45	5	15
331	742	15	0	0	0	5
332	622	15	0	0	0	0
333	537	nd	60	28	10	2
340	849	50	50	25	20	5
341	181	25	50	45	0	5
360	444	60	40	0	40	20
361	225	1	40	0	0	60
362	305	23	22	0	18	60
393	617	80	25	30	25	20
818	277	18	24	0	0	76
835	232	46	3	23	13	61
839	364	77	56	5	4	35
843	266	48	25	1	0	74
850	358	15	80	15	0	5
870	190	60	80	15	0	5
880	1263	40	65	20	5	10
890	242	90	5	15	75	5
891	393	75	25	60	10	5
892	441	20	70	10	15	5

*Percent private land in district insignificant for purpose of this summary.
ND = not determined

Region 4

Hntg Dist	Sq Miles	%Private	%Open	%Restricted	%Leased	%Closed
400	2117		84	10	1	5
401	1811		79	10	1	10
403	661		80	15	0	5
404	2042		84	10	1	5
405	609	90	20	55	5	20
406	707		75	15	5	5
410	1254		84	11	4	0
411	1006		22	65	9	3
412	423		17	72	11	3
413	877	66	10	50	20	20
415	202		5	5	2	88
416	449		25	15	50	10
417	1724		47	35	10	8
418	488		70	15	10	5
419	582		8	83	5	4
420	76		50	20	25	5
421	330	93	45	45	5	5
422	491	69	5	75	15	5
423	213	83	10	40	10	40
424	124	24	17		0	48
425	142	57	0	97	0	3
426	843		9	78	11	2
427	6	0				
428	13	0				
432	493		40	40	10	10
441	598		70	15	5	10
442	386	15	15	60	12	13
444	386	82	25	50	0	25
445	696	88	10	25	40	25
446	625		10	5	80	5
447	748	78	20	30	30	20
448	379		45	50	5	0
449	179		30	40	20	10
450	318	80	10	40	0	50
452	157		5	15	70	10
454	208		60	15	0	25
455*	61	0	100	0	0	0
471	753	78	30	40	10	20

*All public land (BTWMA & Gates Wilderness Area)
*Percent private land in this district insignificant for purpose of this summary.

Region 5

Hntg Dist	Sq Miles	%Private	%Open	%Restricted	%Leased	%Closed
500	1500		38	54	4	4
502	725		24	52	0	24
510	622		21	49	0	30
511	718		58	29	12	1
520	1131		18	28	11	43
530	2049		43	29	19	9
540	583		56	29	1	14
560	867		7	47	23	23
570	1040		23	51	12	14
575	816		15	62	1	22
580	1130		11	47	32	1
590	2877		29	38	11	22

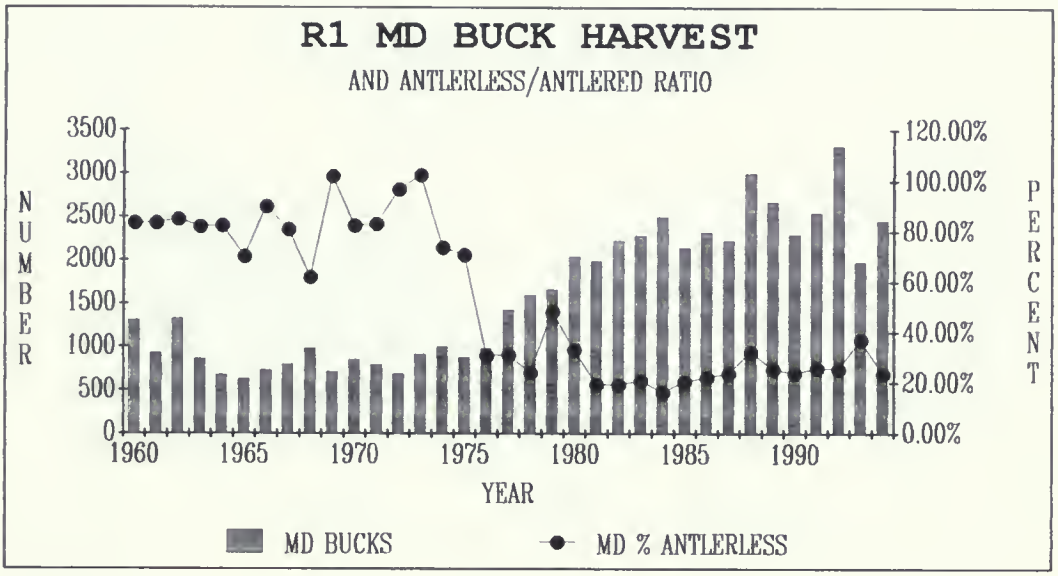
Region 6

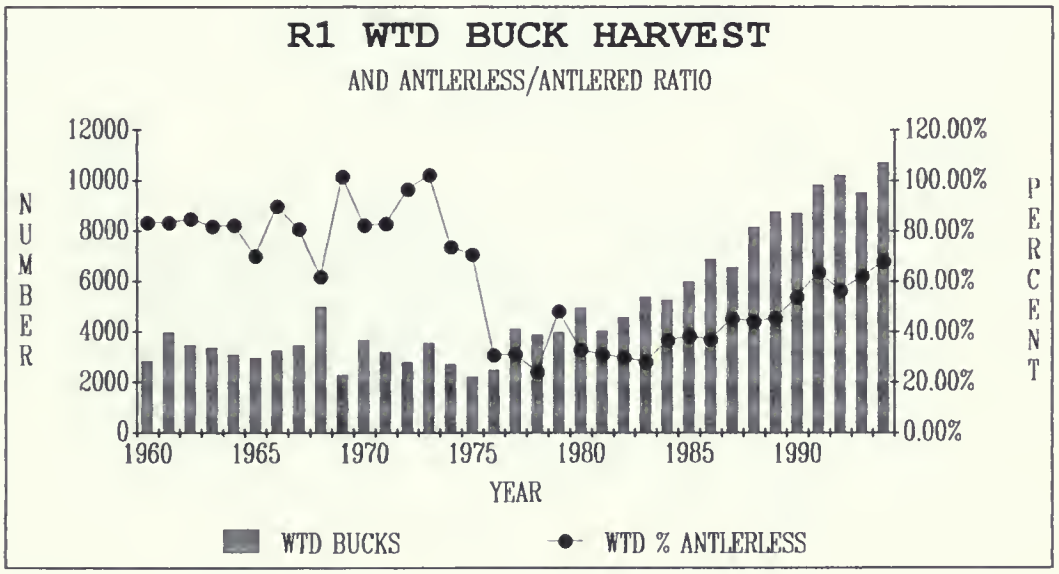
Hntng Dist	Sq Miles	%Private	%Open	%Restricted	%Leased	%Closed
600	3397	69	90	1	4	5
610	2640	88	90	0	0	10
620	1711	58	90	1	4	5
621	277	24	95	0	0	5
622	635	27	90	1	4	5
623	298	17	80	5	15	0
630	1153	36	80	4	11	5
631	242	20	100	0	0	0
632	242	12	95	0	0	5
640	2780	84	90	1	2	7
641	810	89	90	9	1	1
650	1790	72	80	4	11	5
651	2166	91	80	2	8	10
670	2360	49	80	4	11	5
680	1331	56	80	2	8	10
690	1723	85	70	4	11	15

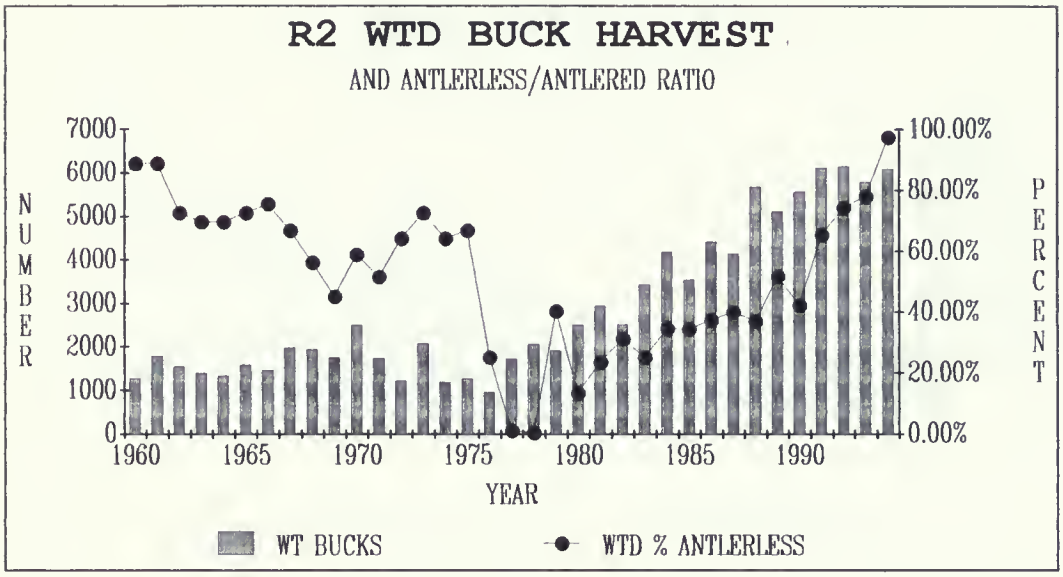
Region 7

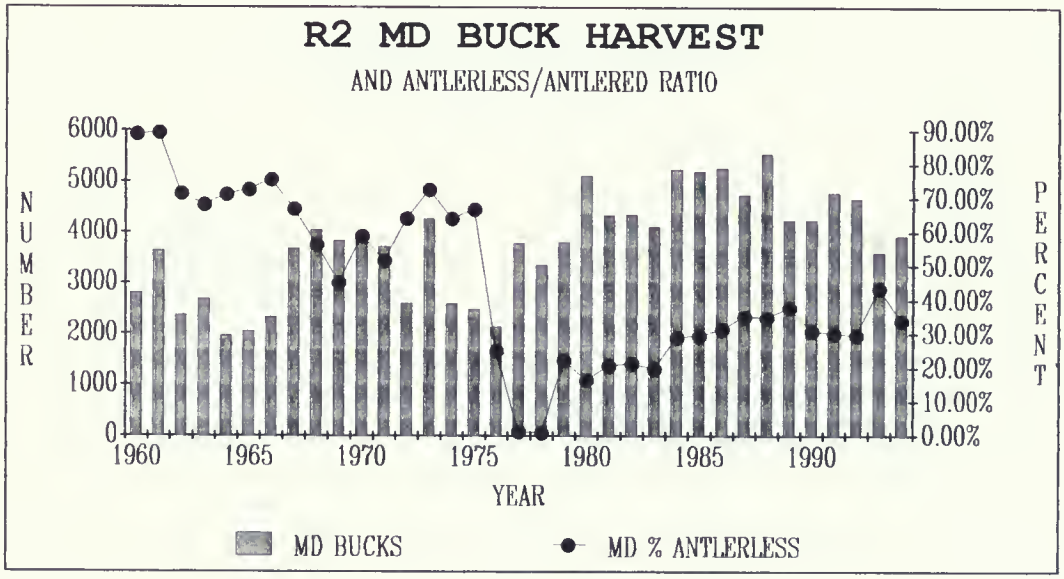
Hntg Dstct	Sq Mls	%Private	%Open	%Restricted	%Leased	%Closed
700	2789		51	13	31	5
701	7224		35	20	25	20
702	2805		30	15	35	20
703	5465		37	30	19	14
704	545		30	7	54	9
705	6168		15	5	79	1

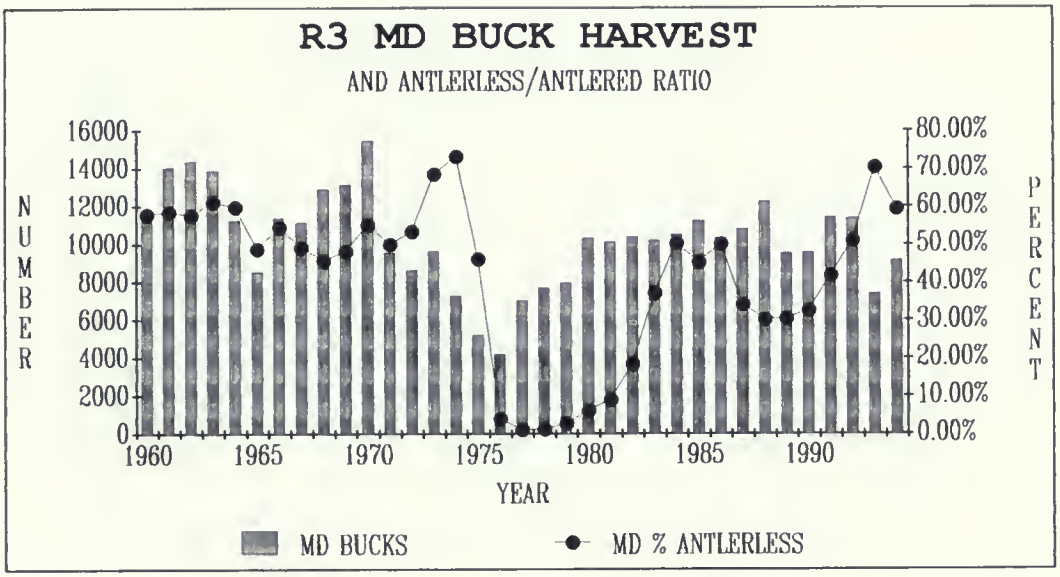
APPENDIX II.

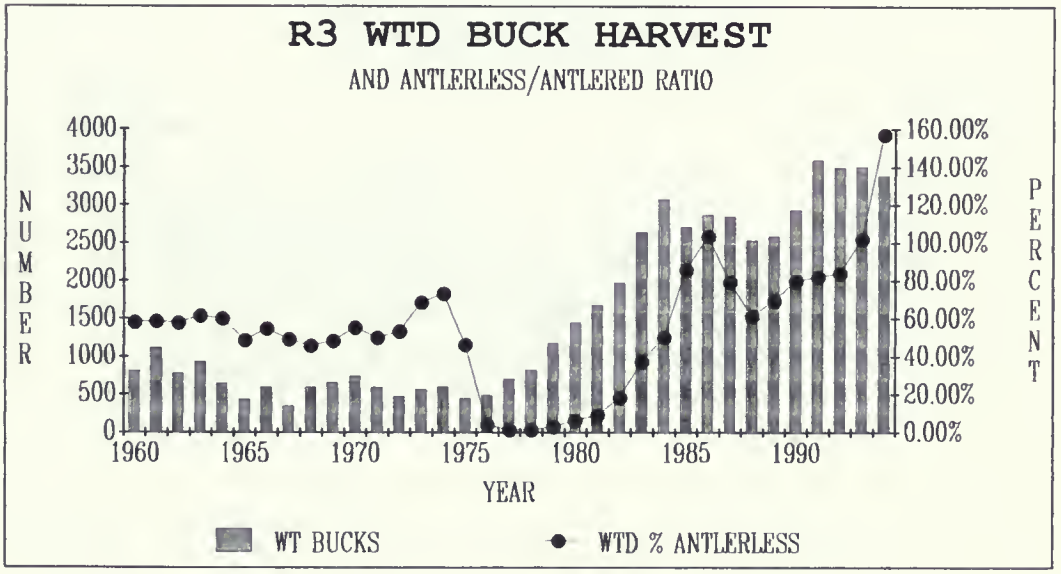

R1 MD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
3500
3000
2500
2000
1500
1000
500
0
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
MD BUCKS
MD % ANTLERLESS

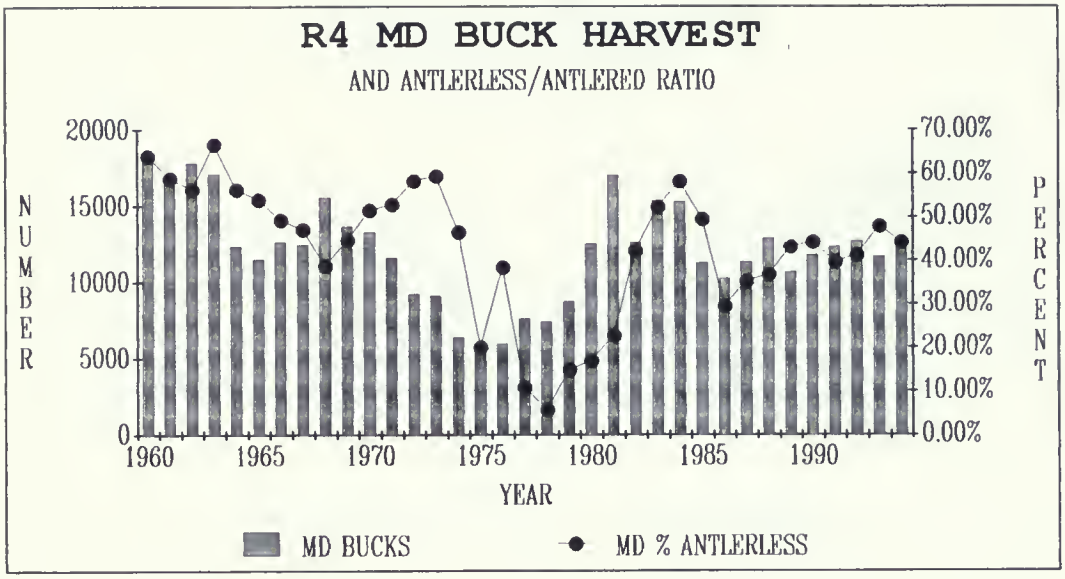

R1 WTD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
12000
10000
8000
6000
4000
2000
0
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
WTD BUCKS
WTD % ANTLERLESS

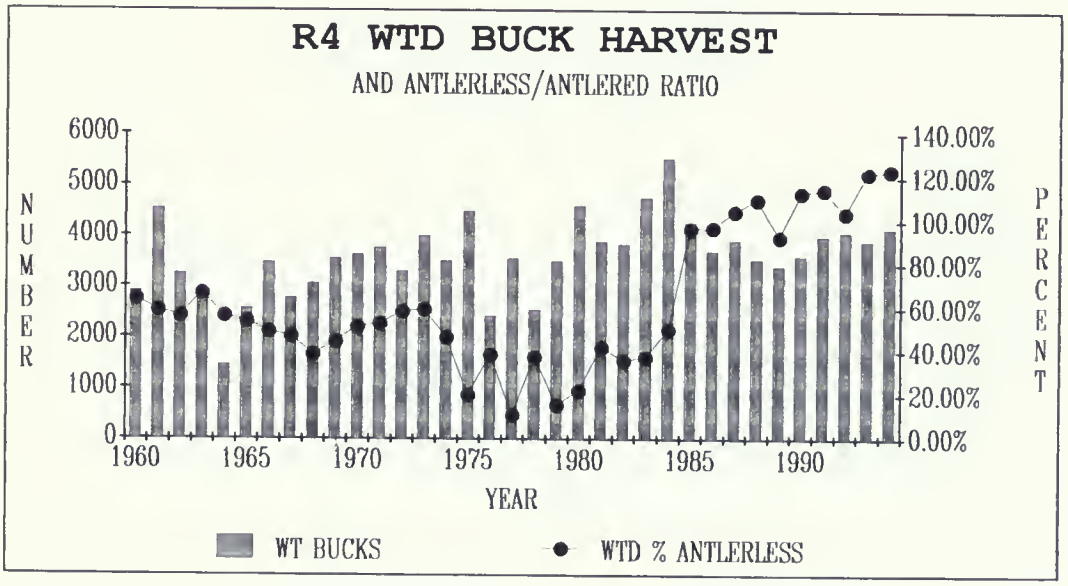

R2 WTD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
7000
6000
5000
4000
3000
2000
1000
0
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
WT BUCKS
WTD % ANTLERLESS

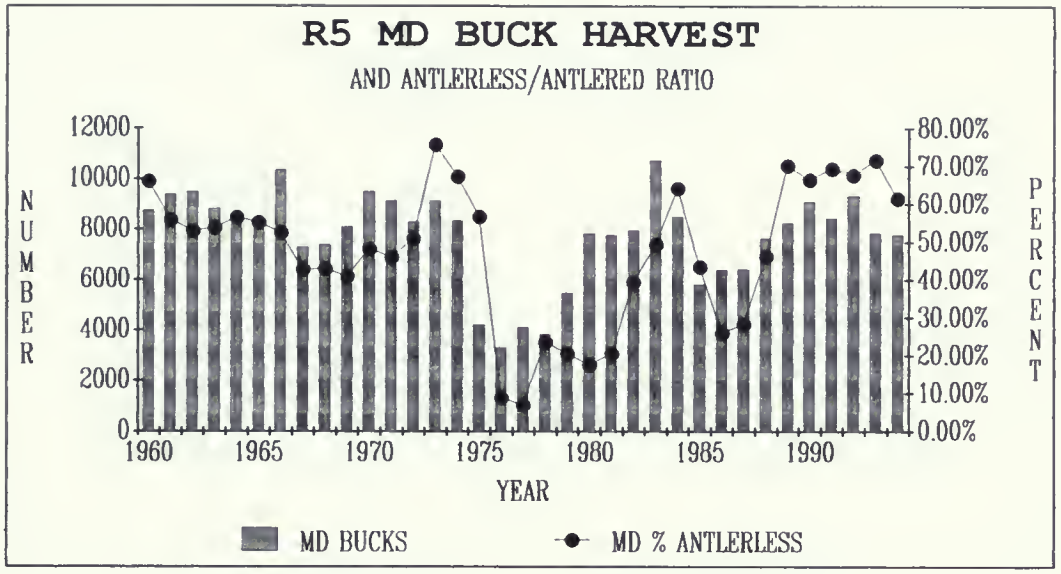

R2 MD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
6000
5000
4000
3000
2000
1000
0
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
MD BUCKS
MD % ANTLERLESS

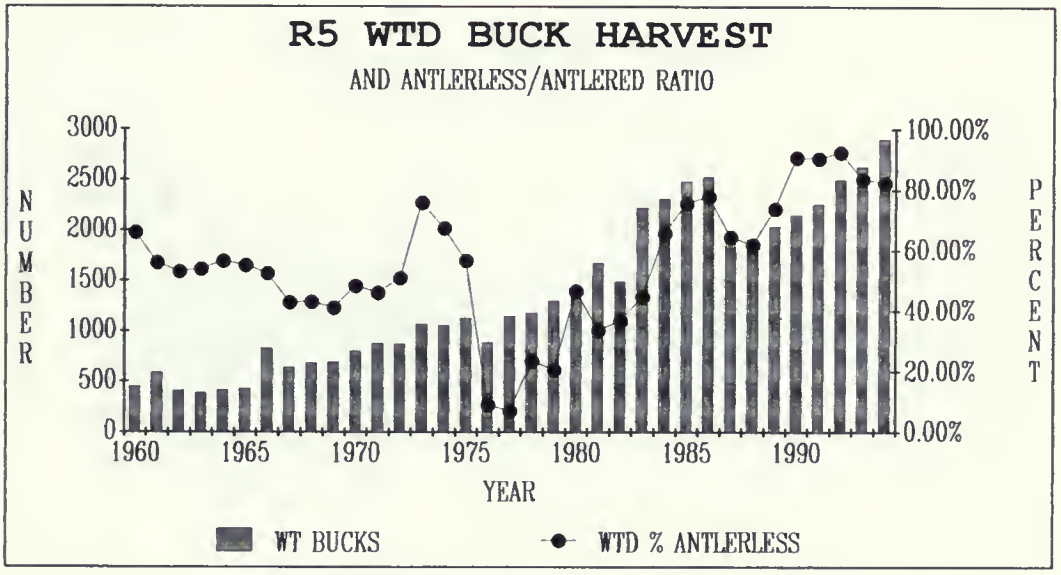

R3 MD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
16000
14000
12000
10000
8000
6000
4000
2000
0
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
MD BUCKS
MD % ANTLERLESS

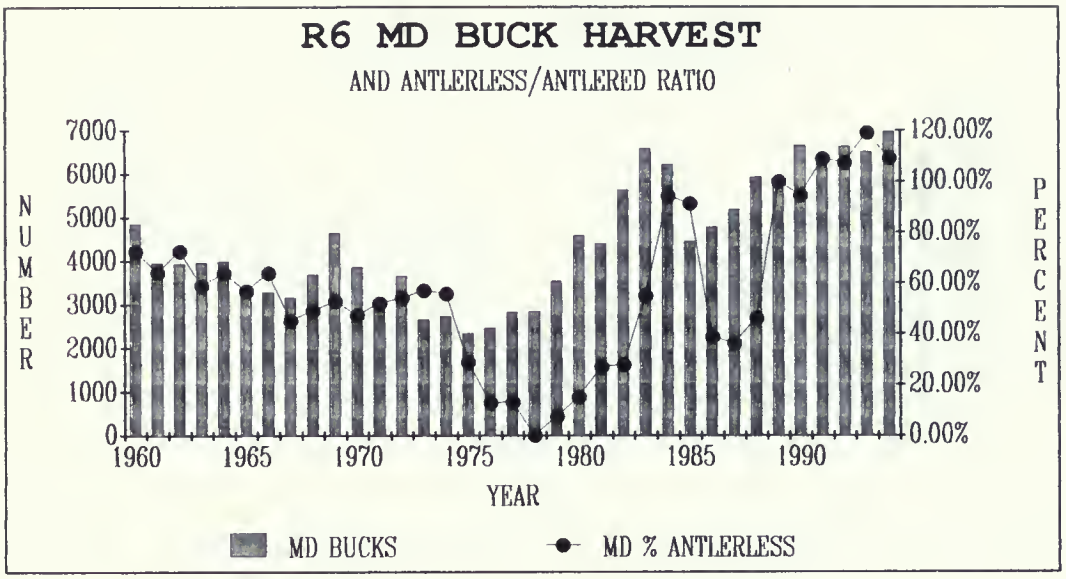

R3 WTD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
4000
3500
3000
2500
2000
1500
1000
500
0
160.00%
140.00%
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
WT BUCKS
WTD % ANTLERLESS

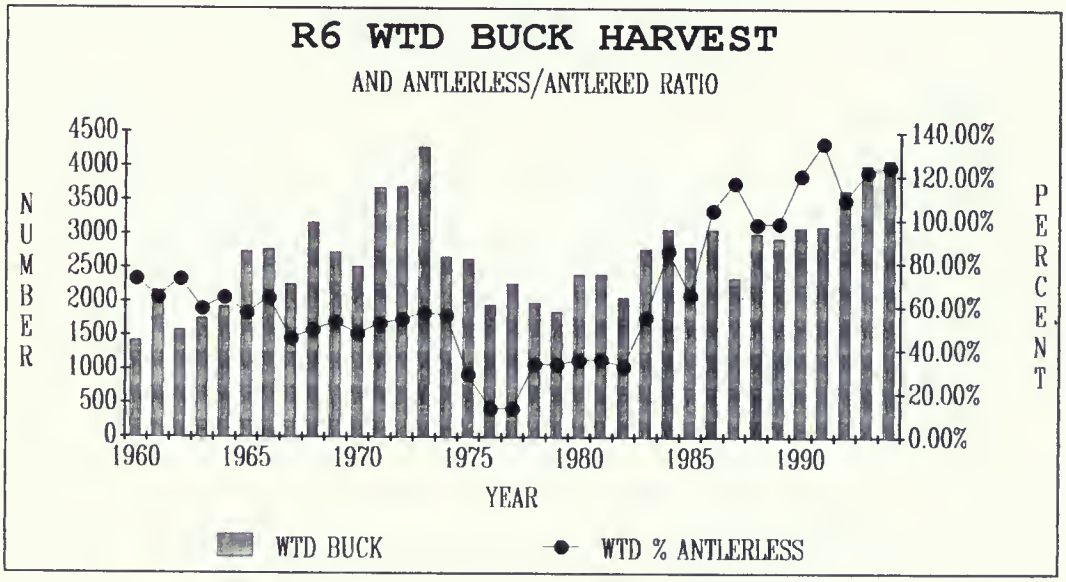

R4 MD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
20000
15000
10000
5000
0
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
MD BUCKS
MD % ANTLERLESS

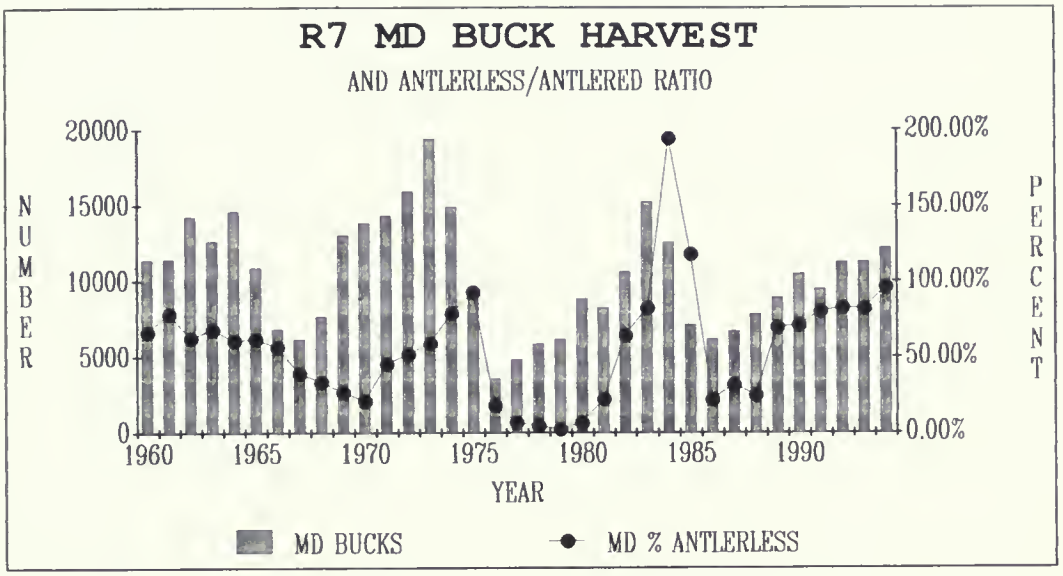

R4 WTD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
6000
5000
4000
3000
2000
1000
0
140.00%
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
WT BUCKS
WTD % ANTLERLESS

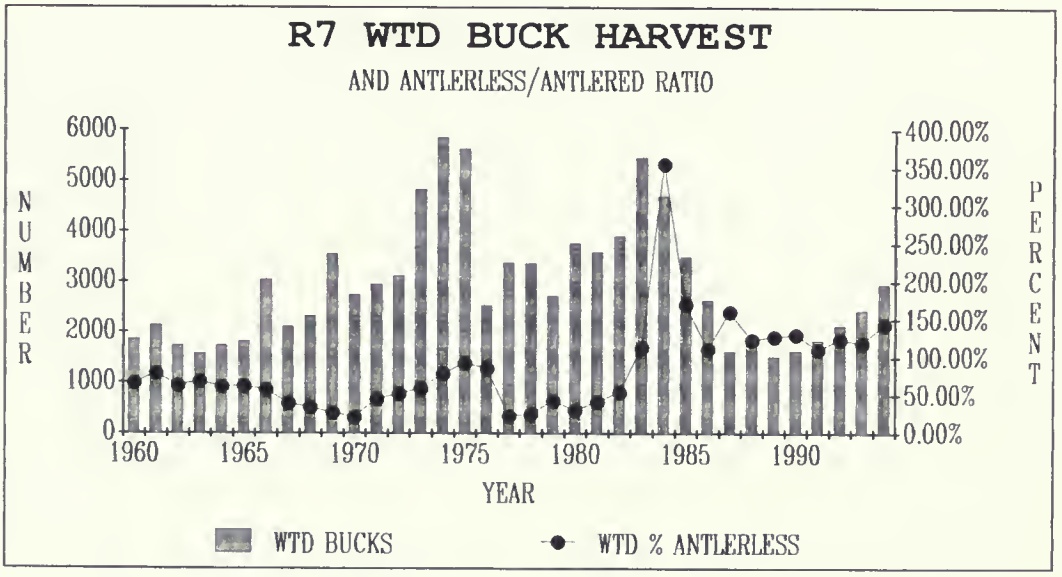

R5 MD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
12000
10000
8000
6000
4000
2000
0
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
MD BUCKS
MD % ANTLERLESS


R5 WTD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
3000
2500
2000
1500
1000
500
0
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
WT BUCKS
WTD % ANTLERLESS


R6 MD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
7000
6000
5000
4000
3000
2000
1000
0
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
MD BUCKS
MD % ANTLERLESS


R6 WTD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
4500
4000
3500
3000
2500
2000
1500
1000
500
0
140.00%
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
WTD BUCK
WTD % ANTLERLESS


R7 MD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
20000
15000
10000
5000
0
200.00%
150.00%
100.00%
50.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
MD BUCKS
MD % ANTLERLESS


R7 WTD BUCK HARVEST
AND ANTLERLESS/ANTLERED RATIO
NUMBER
PERCENT
6000
5000
4000
3000
2000
1000
0
400.00%
350.00%
300.00%
250.00%
200.00%
150.00%
100.00%
50.00%
0.00%
1960
1965
1970
1975
1980
1985
1990
YEAR
WTD BUCKS
WTD % ANTLERLESS

Montana Fish, Wildlife & Parks